

envocHEALTH 2009

Abstracts

**International Conference on
Environment, Occupational & Lifestyle
Concerns - Transdisciplinary Approach**

16 - 19 September 2009



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WELCOME

It gives us a immense pleasure to extend a hearty and warm welcome to all the distinguished scientific delegates & professionals attending the International Conference on "Environment, Occupational & Lifestyle Concerns – Transdisciplinary Approach" at Regional Occupational Health Centre, Bangalore India, from 16th to 19th September 2009.

The main objective of the conference is to provide forum for deliberating the issues in environment, occupational and lifestyle concerns and to gain a better contemporary understanding of occupational and environmental exposures and related issues.

Professors, scientists, researchers, scholars, Academicians and industrialists of various scientific disciplines will share their experiences in this conference and address on research, prevention and intervention measures on environmental and occupational effects on health and disease.

The conference committee brings out this publication containing the abstracts of the lectures and poster presentations.

We are thankful to NIOH-ICMR for giving the opportunity of hosting this event at Bangalore. We hope this conference will be a memorable scientific event of international importance and will be driving the scientific mass in a pedestal of new scientific dimension.

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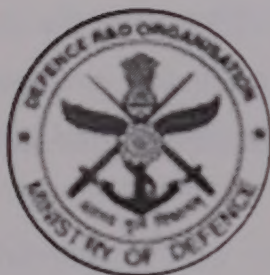
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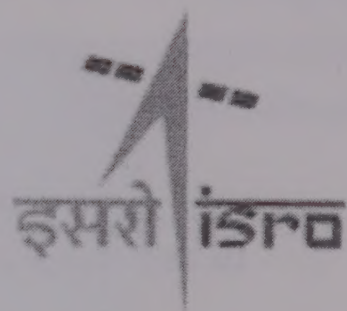


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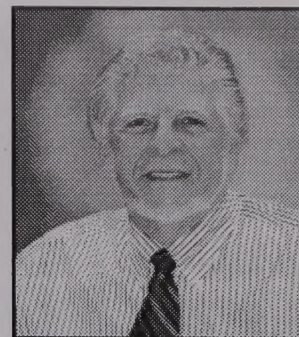
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INTRODUCTORY WELCOME

Dear Colleagues:

Given the pressing global problems affecting human health, dignity and survival, this International Conference on **"Environmental, Occupational and Lifestyle Concerns-Trans-disciplinary Approach"** is certainly both timely and extremely important. Fifty years ago, C.P. Snow **published his famous lecture [1]**, the essence of his message was that, in view of this modern era of powerful scientific ideas and technological potentials, the fact that those having the greatest political and moral influence on the use or non-use of science and technology are those who have the least understanding of the nature of scientific process and implications of the use of that knowledge and technology.

All human decisions to use knowledge and technology depend on the "facts" at hand and the "values" one holds. Our facts can, at worse, be totally incorrect, on one hand, or at best, be incomplete. All facts are, also, "value-laden". Values are derived from our personal world-views and are always "experientially-laden". While values can not be derived from any scientific calculus, nor should our values be ignorant or defiant of our scientific knowledge. In other words, if our world views are not consistent with the scientific facts, we will derive human values which can undermine human health, human dignity and human survival. The concept of "Global Bioethics", should not lead to "miserable survival", but to an subsistence survival that allows each individual to reach their human potential and to minimize human suffering [2, 3]. The task before all of us is going to be extremely difficult due to the pluralistic world we live in, the non-scientific-economic forces driving those in the First- versus the Third- worlds.

The ethical imperative of all scientists should be, as Dr. Van R. Potter stated: "A Bioethic for oncologists: Humility with responsibility" *Cancer Research* 35: 2297-2306, 1975. This points to each scientist to perform his/her talents to solve scientific tradition problems in the creative and rigorous fashion in the traditional manner of science. Since most of these scientific problems are complex issues, requiring multi-disciplinary inquiries, the obligation on each of us is to put that information in forms that can be

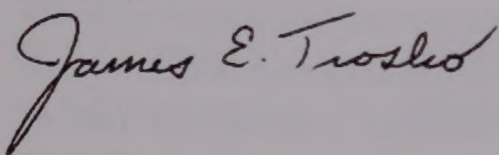
transmitted to other scientific disciplines. More importantly, it demands that we also get more involved in early general education endeavors. We can no longer be satisfied with maintaining the "Two cultures" gap between the few scientists and the non-scientific policy makers and the general non-scientific public.

Therefore, while this conference for scientists of many disciplines is designed to share their disciplinary knowledge with each other, we must be aware of the fact that there will be few non-scientific policy makers here, let alone non-scientific laypersons.

Because of new bio-medical breakthroughs, understanding both ecological and human health problems, major applications, that could affect human lives in multiple ways, as with all new basic scientific and technological knowledge, must be carefully and rigorously examined before unwise application of the incomplete understanding is used unwittingly. A number of scientists in this conference will try to assess the "state of the science" as it might help to address, in a positive manner, to "Environmental, Occupational and Lifestyle Concerns". An examination of the detailed program should convince you that this meeting will highlight many current topics in this area of research.

My fellow organizers look forward to welcoming you to this extremely topical conference that could have significant impact on the successful future of this critical area of research.

Sincerely,

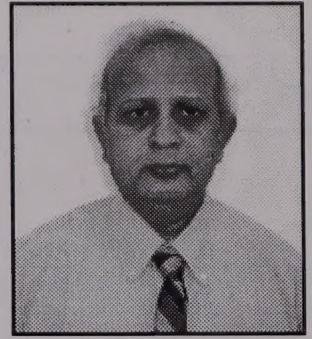
A handwritten signature in cursive script that reads "James E. Trosko".

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PREFACE



It is my distinct pleasure in bringing out the proceedings of the International Conference on envocHEALTH 2009.

A great momentum is gathering on the environmental concerns and its effect on human health. Research, education and advocacy are making us more knowledgeable and conscious on the vulnerability, and being supportive to mitigate health impacts, than it was before. envocHEALTH 2009 is an humble endeavour to bring in a platform for sharing ideas of transdisciplinary specialty on occupational and environmental health. The conference has been successful to attract national and international expertise on topics, namely environment, occupational and lifestyle concern.

As the Chairman of the organizing Committee of the conference, I welcome the dignitaries and delegates. We make new friends and renew old friendship, and build on relationships for the bigger purpose of fraternity, understanding and collaboration. My colleagues have an utmost effort to make your stay comfortable at Bangalore. Wish you all a very fruitful discussion on the emerging areas.

Dr. PK Nag

Director, NIOH

Chair Person, envocHEALTH 2009



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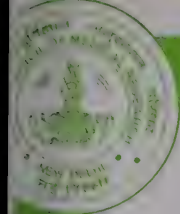
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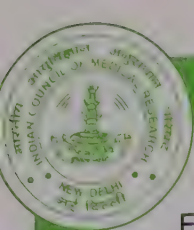
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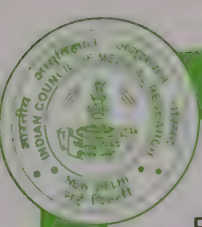
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EPIGENETIC CHEMICAL EFFECTS ON STEM CELLS AND CELL-CELL COMMUNICATION THEIR ROLES IN THE CAUSE AND PREVENTION OF HUMAN CARCINOGENESIS

JAMES E. TROSKO

From the single fertilized egg to the adult human being, consisting of ~100 trillion cells, composed of over 200 cell types, and classified into stem cells, progenitor or transit amplifying cells and terminally-differentiated cells, a delicate homeostatic regulation of cell proliferation, differentiation, apoptosis, adaptive responses of differentiated cells and senescence takes place by three communication processes. Gap junctional intercellular Extra-, Intra-, and Gap Junctional Intracellular Communication (GJIC) was first shown by W. Loewenstein to be responsible for growth control and normal differentiation. Later, the phenotypes of the loss of growth control or "contact inhibition" and of terminal differentiation were shown to be characteristics of cancer cells. Furthermore, when epigenetic chemicals, known to be teratogens or tumor promoters by their ability to induce oxidative stress-induced intra-cellular signaling, were shown to reversibly inhibit GJIC, and when anti-tumor promoters or cancer chemopreventive and chemotherapeutic agents were shown to either prevent the down regulation of GJIC by tumor promoters or to restore GJIC in non-GJIC tumor cells, additional evidence that GJIC played a critical role in the carcinogenic process. In addition, when various oncogenes and tumor suppressor genes modulated GJIC, a mechanistic basis for integrating exogenous factors (chemicals) and endogenous factors (oncogene and tumor suppressor gene proteins) was possible. The ability to isolate human embryonic/adult stem cells demonstrated that the maintenance of the non-differentiated state of these stem cells seemed to be the result of having non-functional GJIC. Upon induction of GJIC in stem cells resulted in the production of life-span limited progenitor cells that could terminally differentiate, senesce or apoptose. The demonstration that these adult stem cells could be "initiated" (to maintain their "immortalized" state) to start the carcinogenic process and ultimately become either "cancer stem cells" (identified by maintaining most of the phenotype of the normal adult stem cells) or "cancer non-stem cells" (being "partially-differentiated"). In summary, the concepts of cancer, described by C. Markert, B. Pierce, V.R. Potter, P.S. Fialkow, P.C. Nowell, & W.R. Loewenstein now seem to be supported by current understanding of the roles of stem cells and cell-cell communication in growth control, differentiation and apoptosis. The disruption of cell-cell communication leads to loss of growth control, differentiation, of senescence and apoptosis, which characterizes cancer as a "disease of stem cells", a "disease of differentiation" and a "disease of homeostasis".

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A COLLISION OF BIOLOGICAL AND CULTURAL EVOLUTION: THE TOXICO-EPIGENOMICS OF ENVIRONMENTAL AND DIETARY CHEMICALS ON STEM CELLS AND CELL-CELL COMMUNICATION IN HUMAN HEALTH AND DISEASES

JAMES E. TROSKO

After millions of years, early evolution of the human species' diet was characterized as "feast or famine" type. With the change of "hunter-gatherer" mode of food gathering, the diets changed to a local agricultural type. With the appearance of science and technology, better sanitation, and a reduction of infectious diseases, a population explosion occurred, forcing a chemical-dependent mode of agriculture and a global diaspora of people and foods. Further alteration of food processing, caloric increases, altered nutrient exposures, regular patterns of feasting, reduction of physical exercise and environmental pollution, the quality and quantity of the kinds of nutrients and calories in the global diets, due to cultural evolution, have affected the biological evolutionary-based genetic backgrounds of racial, ethnic and cultural societies [1].

An integrative synthesis of concepts and an explosion of experimental and epidemiological findings allow new insights as to how the interactions of genetic, environmental, dietary, pharmaceutical, and cultural (social, psychological, economic) factors can influence the health and diseases of human beings. Given that the human being can be viewed as a "cybernetic meat machine", whose homeostatic control of the genomic information at conception in the single cell zygote and throughout embryogenesis, fetal, neonatal, adolescent sexual maturation, mature and geriatric stages of life, must be delicately maintained by the heritage of basic genetic information and the complex interaction of external factors on those genetic factors. Although the net effect of the best maintenance of homeostatic control of cell proliferation, cell differentiation and apoptosis, systems breakdown of the human being and death will inevitably be the ultimate end result. The philosophical aim of scientific understanding of environmental and dietary chemicals is not that, by understanding the process of chemical toxicity and the pathogenesis of diseases, one can live healthy forever and become immortal, but that one can minimize unnecessary diseases that besets the individual either with disabling diseases early in life and shortens humane living or with diseases that make living longer with disabling diseases than drains the quality of life well before death.

In principle, environmental, dietary and pharmaceutical chemicals might affect cells by mutagenesis (genotoxicity), cell killing (cytotoxicity), or alteration of gene expression (epigenesis). It is assumed that chemical toxicants are not mutagenic to genomic DNA of



the stem cells at non-cytotoxic levels, but that they can disrupt homeostatic control of proliferation, differentiation and apoptosis by triggering oxidative stress-induced intra-cellular signaling between stem cells, progenitor and differentiated cells, in and between tissues, to modulate gene expression and gap junctional intercellular communication (GJIC). Because adult stem cells and GJIC exist in all organs, disruption of the quantity or quality of stem cells and gene expression, especially during embryogenesis and fetal development, can lead to chronic diseases, such as birth defects, tumor promotion, atherosclerosis, diabetes, immuno-toxicity, reproductive- and neuro-toxicities (2-4). The Barker hypothesis might be explained by pre-natal exposures that lead to altered stem cell numbers, thereby increasing or decreasing the risk to diseases later in life. Epigenetic alteration of genes by various chemicals can have either detrimental or beneficial health effects.

Nested in this overview is the problem of whether the process of aging is different from the processes or pathogeneses of chronic diseases. The basic assumption of this *Lecture* is that, while both aging and diseases of aging are complex processes, they are intrinsically different, but inseparable, processes and they do share fundamental elements. Namely, both are dependent on the quantity and quality of the stem cell pool in the body and that all the aforementioned factors can influence both the quality and quantity of stem cells. From the single fertilized egg to the aged human individual with approximately 100 trillion cells, consisting of germinal and somatic (adult) stem cells, their transit or progenitor cells and the highly specialized or terminally differentiated cells, the critical organization of the cells during development and aging depends on extra-, intra- and gap junctional –inter-cellular communication. Homeostatic regulation by these three forms of communication is needed for the expression of the approximate 30,000 genes, in order to ensure the programmed appearance of the correct cell types, the organization of tissues and organs, organ systems, consciousness, and behavior in a hierarchical, cybernetic manner.

Reduction or abnormal increases of the quantity of the stem cell pool in any tissue will affect the "aging" of that organ. [5] This, in turn, will affect the homeostatic maintenance of the organ systems of the human. Clearly, not all organs of the body ages uniformly. The quality of the stem cells in any organ, depending on circumstances, can contribute to various disease pathogeneses. In other words, a mutated, altered expression of a gene(s) or the death of a critical number of stem cells could affect the pathogeneses of certain diseases. To the extent that human beings have no control of either the genes they inherit, the condition of the expression of those genes during pregnancy and the exposure of those genes and cells prior to conscious control of ones own body and behavior, certain elements that could predispose one to aging and diseases of aging are already set in motion. To the extent that

after conscious control of one's own behavior, environment, life style, and diet, a degree of control of both the aging and diseases of aging are potentially possible. Given the realities of environmental and economic injustices in the world, any potential strategy to prolong life with a minimum of paralyzing diseases might not be applicable to the world population as a whole. Yet, in principle, to those that can apply those behaviors to protect their stem cell pools, quality and quantity, living longer with a minimal of painful chronic diseases should be possible.

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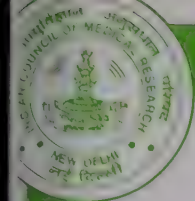


METABOLIC ENGINEERING APPROACHES FOR BIOLOGICAL RADIOPROTECTION

DWARAKANATH. B.S, ANANT NARAYAN BHATT, ABDULLAH FAROOQUE, J S ADHIKARI AND SAURAB SINGH

Protection of biological systems against harmful effects of radiation is of paramount importance during accidental, occupational and unavoidable exposure to radiation. Despite advances in the field of biomedical sciences, availability of radioprotectors and mitigating agents as well as effective therapies suitable for human applications has remained elusive. Damage to biological systems by ionizing radiation is caused primarily by the macromolecular lesions due both to direct interaction of radiation with macromolecules as well as indirectly through reactive oxygen and nitrogen species, amplified by cellular oxygen. Damage to vital organs (viz. hematopoietic and gastro-intestinal systems) mainly contribute to the acute effects of radiation, where the induced mitotic and apoptotic cell deaths are primarily responsible for the loss of survival, while many organs are susceptible for secondary effects in the form of radiation-induced cancer. Therefore, the development of agents and/ or approaches that inhibit radiation-induced apoptosis and mitotic death of vital organs during acute effects and reducing the process of carcinogenesis in susceptible organs is a promising radiation countermeasure strategy. A tight coupling between the metabolic status and signal transduction is critical for the maintenance of homeostasis and its disruption has been widely implicated in the pathogenesis of many diseases and recovery from radiation damage. One of the metabolic changes associated with radio-resistance of tumor cells is the up-regulation of glucose metabolism. Studies from our own laboratory and elsewhere have shown a strong inverse correlation has been found between the degrees of glucose usage and resistance to ionizing radiation in various in vitro models. This appears to be mainly due to a robust antioxidant defense as well as stimulation of pro-survival signaling by the intermediates of glycolysis viz. pyruvate and lactate. Therefore, transient induction of glycolysis by mitochondrial uncoupling can be an attractive cyto-protective strategy, particularly against radiation induced cell death, thereby reducing acute effects. Our recent observations strongly suggest that transient as well as sustained (endogenous) elevation of glycolytic flux leading to significant increase in radio-resistance observed in established cell lines is associated with a decrease in radiation induced DNA damage and augmentation of repair process, thereby reducing the manifestation of damage through mitotic as well as interphase death (apoptosis) pathways. This was accompanied by the over-expression of certain key proteins viz. HK2, MnSOD that are implicated in the regulation of apoptosis and redox signaling. Glycolysis is closely linked to the activation of lymphocytes, thus playing an important role in the regulation of immune responses. Our recent studies have indeed shown that the glycolytic inhibitor 2-deoxy-D-glucose (2-DG) modulates the inducible regulatory T-cell population and associated cytokine signaling. Therefore, modulation of glycolysis can be used as one of the strategies to alter host tumor (or transformed cells) interactions thereby preventing radiation induced immunosuppression, responsible for secondary infection as a result of late radiation effects as well as radiation induced cancer. Further, inclusion of 2-DG as a component of the diet has been found to reduce induced carcinogenesis by modifying intracellular events of the committed/tumor cells as well as systemic factors.

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PHYSIOLOGICAL MECHANISM OF HEALTH IMPAIRMENT DUE TO ENVIRONMENTAL EXPOSURE OF ARSENIC AND FLUORIDE

ROY CHOWDHURY. A

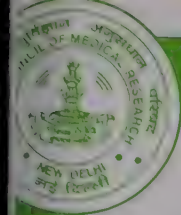
High level of arsenic and fluoride in underground drinking water causes community health hazard in the different parts of India and other parts of the globe. Since the early 80s community are suffering from chronic arsenic toxicity due to exposure through arsenic contaminated ground water used as drinking water in eight districts of West Bengal and forty four districts of Bangladesh. The water concentration of underground arsenic contamination ranging from below 50 mg/L to above 500mg/L in different parts of West Bengal, i.e., Murshidabad, Nadia, 24 Parganas (North and South) and Malda was observed. Similarly high content of subsoil fluoride causes abundant fluoride exposure which leads to fluorosis. Endemic fluorosis was observed in different parts of India, i.e., Gujarat, Rajasthan, Orissa, Tamilnadu, Andhra Pradesh and some parts of Punjab. Moreover, industrial, mining and agricultural activities create the complexity of the issues. The different types of health impairment in biological system due to exposure of arsenic and fluoride were attributed the different physiological mechanism in developing the toxicity at molecular level. Recent study indicated the several controversial theories in the development of arsenic and fluoride toxicity at different level of exposure. Role of parathyroid hormone along with calcium and phosphate metabolism are associated with skeletal fluorosis. High concentration of fluoride exposure inhibited many biochemical functions at cellular level. For example, pyrophosphatase and alkaline phosphatase activity are inhibited 50% when serum fluoride concentration is high among exposed community. Moreover, the activities of glycosaminoglycan which is one of important constituent of bone matrix, may be inhibited due to fluoride toxicity. Major clinical manifestation of arsenic exposure through underground drinking water are hyper pigmentation, keratosis, weakness, anaemia, swelling of legs, liver fibrosis and chronic lung disease. Recent studies indicated that several biochemical events of carbohydrate metabolism at cellular level are associated with arsenic toxicity. There is also a need for further investigation on possible interaction between the development of fluoride and arsenic toxicity at the exposure of various dose level with nutrients in human diet. Thus, the different aspect of the fluoride and arsenic toxicity will be discussed.

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RECENT ADVANCES IN *IN VITRO* TOXICOLOGY TESTING

KUMARAVEL. T. S

With recent advances in cellular and molecular biology, and the increasing awareness of 3Rs- Replacement, Refinement and Reduction in the use of animals for scientific testing, *in vitro* toxicology is becoming more popular. In line with this, the regulators from different countries are now more willing to accept data from *in vitro* toxicology studies for regulatory submissions as long as they are scientifically valid. The EU cosmetics directive has a complete ban on animal testing from 2013 onwards. Tobacco products are currently not allowed to be tested in animals in the EU. Although the regulators for pharmaceuticals advocate 3Rs, they have not yet incorporated *in vitro* testing in their guidelines. *In vitro* toxicology is predominantly performed for candidate selection in pharma scenarios. *In vitro* corrosivity testing using artificial reconstructed skin models are well characterised and fully endorsed by European Center for the Validation of Alternative Methods (ECVAM). These reconstructed skin systems are non-transformed, human cell derived, metabolically active and closely mimic human epidermis. The result generated by these *in vitro* systems has excellent correlations with those generated in animals. Since carcinogenesis is a multi-step process, there are several *in vitro* cancer assays, each looking at a particular step in cancer development. Ames test detects the mutational events that could lead to initiation step of carcinogenesis. The promotion step (and to some extent initiation) is specifically detected by the SHE and NIH3T3 cell transformation assays. Changes in the expression of angiogenesis and intercellular adhesion factors can be correlated with progression and metastasis stages. The anchorage independent cell growth model is a novel *in vitro* cancer assay that detects both initiation, promotion and progression stages of cancer development. In this talk, I will discuss the recent advances in *in vitro* toxicology testing, with special reference to *in vitro* skin irritation/corrosivity, absorption and cancer models. I will also talk about the broader application of these assay types and their relevance to risk assessment of chemicals.

**DRINKING WATER QUALITY AND HEALTH ISSUES**

SHASHIREKHA. M.V¹, S. N. NAGARAJA SHARMA²

The health and well being of people is dependant on the quality of water they use for drinking and cooking, type of food they eat and the life style. In recent years people in different parts of the country are affected due to poor quality of drinking water. In Karnataka state also the quality of drinking water has deteriorated, This may be attributed to mining activities, effluents from industries, municipal sewage, use of chemical fertilizers, lowering of groundwater levels etc. The major chemical constituents found in excess of permissible limits are TDS, Fluoride, Nitrate, Iron, and salinity. In some areas presence of some of the heavy metals, Arsenic is also observed. Fluorosis is found in districts like Kolar and Raichur. Based on the studies conducted over the years, the prevailing status of quality of drinking water in the state is presented here. The causes for affecting the water quality and some possible remedial measures are also discussed.

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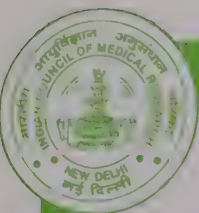
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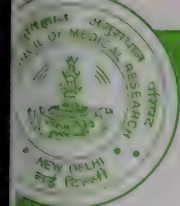
IONIZING RADIATION – RISK VS BENEFIT

MARY N. MOHANKUMAR

Ionizing radiation has always been a part of the human environment. Along with natural radioactive sources present in the Earth's crust and cosmic radiation, man-made sources also contribute to our continuous exposure to ionizing radiation. Environmental radioactive pollution has resulted from past nuclear weapons testing, nuclear waste disposal, accidents at nuclear power plants, as well as from transportation, storage, loss, and misuse of radioactive sources. While there are risks associated with exposure to radiation, benefits of nuclear applications in medicine industry and science are well established. Man-made operations like oil and gas production and processing operations result in technologically enhanced naturally occurring radioactive materials (TENORM) to accumulate at elevated concentrations in by-product waste streams. Besides, increasing use of ionizing radiation in medical diagnosis is now of concern. It is now estimated that with the increasing use of CT Scans and mammography, medical radiation exposure may soon contribute to about 50% of the total background radiation exposures to the public, as against 14% a decade ago. As technical innovations promise greater diagnostic accuracy, there is the potential for greater radiation doses to the public. Other man-made radiation sources include TENORM industries. In India, mining of beach minerals is a profitable industry. The south Indian coast beach sands are rich sources of minerals such as ilmenite, rutile, zircon, silimanite and garnet. The tailing obtained after the extraction of the above minerals get enriched with monozite, a thorium bearing mineral that is radioactive. Recent studies show that the activities in the tailings are somewhat more than the natural background levels. Increasing use of granite flooring and countertops, air-conditioned working and living atmospheres do add to TENORM in the environment. These issues need to be addressed by systematic studies in developing countries like India, similar to the ones being undertaken in developed nations. A better understanding of the effects of low doses of ionising radiation is critical to formulating protection criteria for the public, workers and the environment in order to achieve a responsible balance in assessing the use of nuclear technologies in industry, medicine, and energy production.

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THE BIOMARKERS OF COLONIC PRENEOPLASIA: ABERRANT CRYPT FOCI, AN EXPERIMENTAL MODEL AND ITS ROLE IN CANCER PREVENTION

RP BIRD

Environmental factors play an important role in the pathogenesis of a number of chronic illnesses including cancer. There are limited numbers of biomarkers of preneoplasia that are quantifiable and assess the risk of developing cancer. We have developed a method that allows quantification of the preneoplastic state in the colon in animal models. These preneoplastic lesions are termed "Aberrant Crypt Foci" (ACF). These ACF are also present in human colons with high risk of developing colon cancer. ACF model is being used to identify cancer preventive and cancer promoting agent/environment in our laboratory and internationally.

We have demonstrated that these ACF possess dysplasia and mutations and that they have elevated levels of a number of proteins, purported to promote tumor growth and survival. Recently we have found that the ACF growth is affected by their location in the colon and obesity augments their growth. Using Zucker Obese rats we have shown that a chronic state of inflammation associated with obesity appear to be a significant factor in promoting tumorigenesis and in turn affect the tumor phenotype. We have demonstrated that the metabolic state of the host, significantly affects the process of tumorigenesis. We are using a variety of experimental approaches to explore how the biological state of the preneoplastic lesions and tumors alters their ability to respond to cancer preventive agents. The ultimate goal of our research is to use ACF and subsequently tumors to understand integrate tumor/cancer biology with therapeutic approaches including the role of environmental factors in this process.

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CARDIOVASCULAR IMPACTS OF URBAN AIR POLLUTANTS

RENAUD VINCENT, PREM KUMARATHASAN, ERROL THOMSON, SUBRAMANIAN KARTHIKEYAN

Low levels of urban air pollutants were shown fifteen years ago in Canada and US to be associated epidemiologically with acute cardiovascular outcomes. Intensive toxicological investigations have followed to identify mechanisms of action to validate a biological plausibility for the association. There is now a general consensus that the association is causal. We review here one line of evidence supporting the initiation of acute cardiovascular changes from exposure to particulate matter (PM) and oxidant gases that may also be relevant to chronic heart diseases. Inhalation of urban particles in rats has been shown to cause elevation of the circulating levels of the vasoactive peptide endothelin (ET)-1, with a corresponding increase of systemic blood pressure. Similarly, inhalation of PM_{2.5} increases circulating endothelins and causes vasoconstriction in human volunteers. Increases of circulating ET-1 coincide with elevation of the steady state mRNA levels for preproET-1 and endothelin converting enzyme in the lungs of animals after inhalation of PM or ozone, pointing to the lung endothelium as a target of the pollutants. Interception of superoxide in rats abrogates the endothelin response, supporting the view that PM and ozone cause endothelial dysfunction through an oxidative stress pathway. While ET-1 is involved primarily in the control of local vascular tone, which may account for some of the acute impacts of air pollutants, activation of the endothelinergic system is also implicated in chronic conditions such as atherosclerosis and pulmonary hypertension. The observation that instillation of urban particles in hyperlipidemic rabbits can accelerate the development of atherosclerosis was followed by epidemiological evidence in human populations of a link between air pollution and atherosclerosis. Evidence from children in Mexico City also reveals elevation of ET-1 and pulmonary artery pressure with exposure to pollution, with possible acceleration of pulmonary hypertension. The cardiovascular impacts of air pollutants are particularly relevant to India. By 2010, India will account for a disproportionate 60% of all heart diseases worldwide. In addition to a population growth of 20 million per year and the country's continued reliance on large coal reserves, affluence will bring a projected increase in car sales from the 1 million units sold in 2004, to 2 million per year in 2010 and 20 million per year in 2030. Vehicular traffic, the major source of air pollution in large cities, is expected to increase significantly, and it is likely that urban air pollution will be a significant contributor to heart diseases.

Environmental Health Sciences and Research Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario, Canada



NANOMATERIALS FOR ENVIRONMENTAL CLEAN-UP TECHNOLOGY: PHOTOCATALYTIC DEGRADATION OF 2,4,6-TRICHLOROPHENOL PRESENT IN WATER AND WASTEWATER BY MODIFIED AND UNMODIFIED TiO_2

SELVARAJ RENGARAJ¹, X. Z. LI.² AND MIKA SILLANPAA¹

Research into water purification using advanced oxidation technologies is expanding steadily. The majority of investigations on the chloroaromatic compounds are based on photochemical and photocatalytical methods. During the last two decades there has been a growing concern related to the environmental and health impacts and environmental damage due to chlorinated organic compounds. The presence of chlorinated aromatic compounds in the aqueous environment is a consequence of the widespread use of chlorinated organics in a variety of industrial processes. These substances are persistent and have been shown to accumulate in the environment. Therefore, it is important to find innovative and cost-effective methods for the safe and complete destruction of chlorinated organics such as chlorophenols. The conventional treatment technologies include biological treatment, adsorption technology, air stripping and incineration. However, those techniques have some limitations and disadvantages. Therefore, the current trend in treatment has moved from phase transfer to destruction of pollutants such as advanced oxidation processes (AOPs). These techniques involve reactive free radical species for non selective mineralisation of organic compounds to harmless end products. Therefore, in the present work, a series of nanosize titanium dioxide (TiO_2) doped with silver (Ag) were synthesized by a sol-gel method with a doping content up to 2 wt%-Ag. The physico-chemical characteristics of the synthesized catalysts were characterized by X-ray diffraction, X-ray photoelectron emission spectroscopy, transmission electron microscopy, UV-vis absorption spectrometer, and optical ellipsometry to study the influence of the Ag content on the surface properties, optical absorption and other characteristics of the photocatalysts. The photocatalytic activity of the Ag- TiO_2 was evaluated in the 2,4,6-trichlorophenol (TCP) degradation and mineralization in aqueous solution under UV-A illumination. The experiments demonstrated that TCP was effectively degraded by more than 95% within 120 min. It was confirmed that the presence of Ag on TiO_2 catalysts could enhance the photocatalytic oxidation of TCP in aqueous suspension and the experimental results showed that the kinetics of TCP degradation follows a pseudo-first-order kinetic model. It was found that an optimal dosage of 0.5 wt% Ag in TiO_2 achieved the fastest TCP degradation under the experimental conditions. The experimental results of TCP mineralization indicated while total organic carbon was reduced by a high portion of up to 80% within 120 min, most chlorine on TCP was more quickly converted to chloride within the first 40 min. On the basis of various characterizations of the photocatalysts, the reactions involved to explain the photocatalytic activity enhancement due to Ag doping include a better separation of photogenerated charge carriers and improved oxygen reduction inducing a higher extent of degradation of aromatics.

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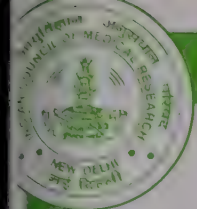
ELIMINATION OF ASBESTOS-RELATED DISEASES – OBJECTIVE APPROACH

EVGENY KOVALEVSKIY¹, SERGEY KASHANSKY²

One of the matters of the Global Plan of Action on Workers' Health for 2008–2017 adopted by 60th session of World Health Assembly is Global campaign for elimination of asbestos-related diseases – bearing in mind a differentiated approach to regulating its various forms – in line with relevant international legal instruments and the latest evidence for effective interventions. In 2007 ILO and WHO edited joint document entitled "Outline for the Development of National Programmes for Elimination of Asbestos Related Diseases". Russia is the largest asbestos producer and consumer in the world. In Russia only chrysotile asbestos is produced and used for civil purposes. Over 50 percent is used for inner consumption (predominantly for asbestos cement production). Basic positions of the current Russian legislative documents are: the use of amphiboles is banned; work with chrysotile asbestos-containing materials should be performed under control and accompanied by safety measures; free of charge obligatory special medical examinations should be carried out before, during, and after occupational contacts with asbestos dust; asbestos-related diseases are included in the official list of occupational diseases and compensated automatically if occupational contact with asbestos is proved. Taking in the account positions of ILO/WHO documents, the Ministry of Health and Social Development of the Russian Federation issued an order to develop a project of National Program for Elimination of Asbestos-Related Diseases for the period of 2008 - 2017. First steps realization beginning in 2009 (national asbestos profile preparation, evaluation of risks in different conditions and improvement of active legislation). Priority directions of further actions would be selected on the base of received information.

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**BIOMARKER DISCOVERY FOR TOXICITY MECHANISMS RELEVANT TO AIR POLLUTION-INDUCED HEALTH EFFECTS**

PREM KUMARATHASAN AND RENAUD VINCENT

Extensive epidemiologic research find association between cardiopulmonary mortality and morbidity and exposure to ambient air pollution. Public health concern arises due to large population exposures as well as existence of vulnerable groups such as elderly and children along with diabetics and those with existing cardiopulmonary diseases. The matrix of air pollutants is complex and vary in physicochemical characteristics and therefore it is challenging to understand toxicity mechanisms underlying the air pollutant exposure-induced adverse health outcome. This difficulty is magnified further by health effects seen at low levels of air pollutant exposures. We are applying biomarker discovery to address a number of critical questions that will enable us to better understand the biological basis of air pollution exposure-induced health effects. Current advances in analytical technologies favour reliable biomarker discovery. Here we will discuss the biomarker approaches, the technologies and how they were applied to understand for instance, effects of individual vs pollutant mixtures, time-related effects, host-pollutant interactions and thus potential toxicity mechanisms that can explain the observed adverse health outcomes.

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RELEVANCE OF RS9642880[T], *GSTM1* 0/0 AND OCCUPATIONAL EXPOSURE SUSCEPTIBILITY TO URINARY BLADDER CANCER

MATTHIAS HERMES

Kiemeny et al.¹ performed a genome wide SNP association study and they identified a sequence variant 30 kb upstream of the *c-Myc* gene (allele T of rs9642880) that confers susceptibility to urinary bladder cancer. In this study they did not consider the role of exposure to bladder carcinogens. Encouraged by this we analyzed the relevance of this polymorphism in 515 bladder cancer cases and 893 controls where the quality and quantity of occupational exposure to bladder carcinogens has been documented. We found in our case-series that rs9642880[T] was influential, in contrast to *GSTM1* 0/0 if we do not select our data for occupational exposure. Focusing on those occupationally exposed to aromatic amines and polycyclic aromatic hydrocarbons rs9642880[T] was not influential but *GSTM1* 0/0 was significantly associated with bladder cancer risk. The extent of exposure to urinary bladder carcinogens seems to have a wide impact on the degree to which rs9642880[T] and *GSTM1* 0/0 confer susceptibility to urinary bladder cancer.

**ENVIRONMENTAL RESIDUE LEVELS OF SELECT XENOBIOTICS IN INDIA; BIRDS – AN EFFECTIVE INDICATOR?****S. MURALIDHARAN¹ AND V. DHANANJAYAN²**

There has been an ongoing concern about the presence of different types of contaminants in the environment and their ill effects on wildlife, particularly birds. As birds, by virtue of their position in the food chain, reflect the problem in the environment better than many other ecosystem components, a study was initiated to document the persistent organic contaminants in birds in India. Dead birds collected on opportunistic basis and during specific field visits were considered for the study. Totally 1150 birds comprising 108 species were received from different parts of the country. Varying levels of organochlorine residues were found in all the species investigated. HCH and DDT were more frequently detected in various tissues of birds than other chemicals tested. Among the isomers of HCH, α -HCH was most predominant. Similarly *p,p'*-DDE, the metabolite of *p,p'*-DDT, accumulated the maximum in many of the birds studied. Carnivorous birds contained the highest concentrations of pesticide residues than the birds with other food habits. Significantly, high levels of OCPs were detected in birds of Ahmedabad than other places. Incidentally, none of the tissues tested was free from PCB congeners and PAH metabolites. In many cases Σ PCB and Σ PAH levels exceeded the levels associated with potential avian health effects. Although such levels are not likely to show impact on the demographic performances of the birds, may cause decreased reproduction or survival in combination with other non-anthropogenic stressors such as food scarcity. The data collected in this study therefore, could be used to determine if thresholds have been reached for contaminants those are known to cause reproductive impairment or developmental deformities; and determine changes in contaminant load over the years within and between states. The present investigation looked at the contamination level of only the persistent organochlorines. However, there are a number of organophosphorous and carbamate pesticides being used at considerable quantum. Although these chemicals do not stay in the system for a long time, they are also capable of creating ecological imbalance in the event of exposure. It is imperative to implement stricter environmental controls in the country in order to minimize potential risk to wildlife and also to human beings. Further, site specific and species-specific routine monitoring should be initiated.

Keywords: Environmental contaminants, xenobiotics, birds, Indicators, India

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THE NEW ICH GUIDANCE ON GENOTOXICITY TESTING

MASAMITSU HONMA

The International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use (ICH) has started a revision of the genotoxicity guidance (S2A and S2B) from 2006. The current genotoxicity guidance documents were adopted in 1996 (S2A) and 1997 (S2B). During the last decade, there have been new developments and a wealth of genotoxicity data with the potential to reconsider the guidance. The major issue initiating the revision is the high rate of positive findings especially in the *in vitro* mammalian cell tests, i.e., MLA and CA. Because high concentration, in particular, produces positive results, which are not relevant to human risk, we changed the criteria of top concentration from 10 mM to 1mM. We also proposed an option to omit *in vitro* mammalian cell tests from the standard testing battery. This option, however, needs 2 *in vivo* tests for the compensation. These recommendations intended to consider tests/protocols that identify genotoxicity under realistic conditions which provide information more useful to human risk evaluation. The other issue is the taking into consideration of 3R's (Replacement, Reduction, Refinement) for *in vivo* genotoxicity tests. In particular, the ICH steering committee strongly encourages the reduction of the number of animals in any animal studies. However, the new option looks to opposite to the request. We consider the integration of genotoxicity tests into a general toxicity test and the combination of multiple genotoxicity tests in a single study to reduce the number of animals. In *in vivo* genotoxicity tests, the micronuclei test in peripheral blood or bone marrow is essential. As a second, liver is highly recommended as a target, and the Comet assay could be applied. The new ICH guidance will be issued sooner.

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GENOMIC AND PROTEOMIC APPROACH IN TOXICOLOGY

TAKAYOSHI SUZUKI

Recent advance in genomics and proteomics brought new fields and tolls for toxicology. The innovation of micorarray opened a research field called "Toxicogenomics". Thousands of gene expression can be simultaneously analyzed on a small DNA microarray (or chip). This is a powerful tool for studying comprehensively the biological consequence of chemical exposure. An introduction of such new technology is important to improve outcomes of genetic toxicology tests. An accumulation of gene expression data by various mutagens will be useful to pick up important transcriptional responses against genotoxicants. Those genes can be used as the predictors for genotoxic chemicals. In addition, precise classification of gene expression data enables a prediction of mode of actions by unknown chemicals. In this presentation, I will introduce our collaborative study on the toxicogenomics performed by the JEMS/MMS (Mammalian Mutagenesis Study Group in Japanese Environmental Mutagen Society). We have evaluated about utility of DNA microarrays for mutation research. Initially, we used original and commercial DNA microarrays to examine differential gene expression between seven genotoxic hepatocarcinogens (diethylnitrosamine, ethyl nitrosourea, dipropylnitrosamine, dimethylnitrosamine, o-aminoazotoluene, dibenzo[a,l]pyrene, DMBA) and five non-genotoxic hepatocarcinogens (ethanol, phenobarbital, DEHP, CCl₄, and trichloroethylene) in 9 week-old male mouse liver at 4 h to 28 days after administration. From a large set of expression data, we selected about 50 genes that showed differential response between genotoxic and non-genotoxic hepatocarcinogens.

Then, the primers for the selected genes were designed and quantitative RT-PCR analysis was performed to confirm the GeneChip data. In general, the results of RT-PCR and GeneChip analysis were matched, but the RT-PCR gave greater changes than GeneChip. Dose-dependent increase was observed in gene expression for the several selected genes when treated with DEN and ENU. From these results, it is clear that RT-PCR analysis is much easier and less expensive method for gene expression analysis once the responsible genes were selected.

In order to validate the RT-PCR screening with the selected genes, we used additional sets of gentoxic/nongenotoxic compounds. After a refinement of relevant genes and data analysis algorism, we could achieve a complete discrimination of genotoxic hepatocarcinogens and non-genotoxic chemicals. The usefulness of the quantitative RT-PCR analysis on selected genes for the rapid screening of genotoxicity will be discussed. As another approach, we have also studied on proteomics for its application to toxicology. A rapid improvement of mass



spectrometry facilitated the proteomics research these days. We started our trial to find new biomarkers for genotoxicity using nano-LC-MS/MS (DiNa-QstarXL) system. Urine samples from mouse treated ip with genotoxic carcinogens (quinoline, 4-dimethylaminoazobenzene, N-nitrosomorpholine and 2,4-diamonotoluene) or non-genotoxic chemicals (clofibrate, 1,4-dichlorobenzene, 1-naphtylisothiocyanate, glycine), were obtained from the collaborative study in JEMS/MMS.

The urine was collected compulsorily at the sacrifice (4 and 48 hr after the treatment). The 5 ml of urine was digested by trypsin and 20 ng of peptides were injected to the online nano-LC MS/MS analysis. All the peptide signals were visualized on 3D map using Pep3D (freely available from SPC/ISB) and mzMore (originally developing) software. With a sensitive nano LC-MS/MS system, few ml of urine is sufficient to overview the peptidome. By using 2 hour gradient, we could observe more than a thousand peptide signals. Several peptides changed their intensity both within and between the treatments. Quinoline, and N-nitrosomorpholine treatment showed alteration of six peptide signals in common, but no changes in non-genotoxic chemicals. We tried focused identification of these peptides and identified one of them as novel member of major urinary protein. The high abundant proteins found in the mouse urine sample were the major restriction in loading more amounts of peptide sample to cover low abundant peptides. When human urine samples were analyzed, more number of peptides were observed without any major urinary proteins, which can increase the chance to detect relevant biomarkers. For more precise quantification of peptides, we used stable isotope-tagged method (cICAT). Recent introduction of the higher resolution mass spectrometry; the LTQ-Orbitrap, greatly improved the coverage and identification of low abundant proteins. The future direction of sensitive and automated proteome analysis with or without isotope labeling is being discussed. Proteomic approach could be a promising new field of mutation research, which is readily applicable for exposed human samples. We are going to analyze human urine samples collected from arsenic exposed residents in Bangladesh for biomarker discovery.

**BLADDER CANCER AND OCCUPATIONAL EXPOSURE IN HIGHLY INDUSTRIALIZED AREAS**

GOLKA. K.

Occupational exposure to aromatic amines is a known bladder cancer risk factor whereas the impact of exposure to azo dyes which could release aromatic amines in human organism has been discussed controversially. Therefore, the impact of occupational exposures to colorants has been investigated in 2 studies. A case-control study was performed in all 3 urological departments in Dortmund, Germany, located in an area of former coal, iron, and steel industries, including 412 male urothelial bladder cancer in-patients (cases) and 414 in-patients with benign prostatic hyperplasia (controls). Smoking habits were identified as the main confounder for occupational bladder cancer risk. Smoking-adjusted relative risks for bladder cancer were elevated in underground hard coal miners (OR 2.54, 95% CI 1.64-3.93), chemical workers (OR 2.16, 95% CI 0.87-5.38), painters/varnishers (OR 2.42, 95% CI 1.05-5.57), technicians (OR 1.99, 95% CI 0.95-4.16), and foundry workers (OR 2.22, 95% CI 0.53-9.08). A decade later, another case-control study on 156 bladder cancer cases and 336 prostate cancer cases as controls who had requested for an after-care treatment was performed in the federal state of North Rhine-Westphalia, Germany. The relative bladder cancer risk was adjusted for age and smoking. The adjusted odds ratio for bladder cancer was elevated in 7 painters (OR 1.98, 95% CI 0.64-6.11), in 4 hairdressers (OR 4.9, 95% CI 0.85-28.39) and in 16 cases who reported on a wood processing occupation (OR 1.19, 95% CI 0.58-2.41). Ten of these 16 cases reported on a long-term exposure to colorants (OR 1.84, 95% CI 0.68-4.95). The results of the two epidemiological studies confirm the hypothesis, that persons exposed to colorants in former decades have an elevated bladder cancer risk.

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VECTOR CONTROL STRATEGIES: CHALLENGES AND OPPORTUNITIES

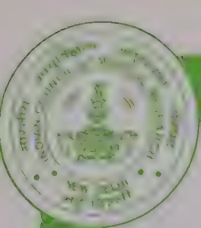
S.K. GHOSH

Vector borne diseases namely malaria, filariasis, Japanese Encephalitis, dengue, more recent chikungunya, kalazar are prevalent in India. Soon after the great discovery of the role of mosquitoes in malaria transmission by Ronald Ross, the importance of the vector control was realized. In the beginning, environmental management, vector sanitation and limited use of chemical larvicides were attempted. A new era began with invent of DDT that changed the entire scenario of vector control operation. Many countries achieved to eradicate malaria which was the centre of attraction. No one could realize the possible fall out of this method and faced resurgence of most of the diseases that were thought to be eliminated. Many strategies have attempted on the roll-back mode that made certain impact on the renewed disease transmission. Over the years, human life style, migration have changed drastically. Rapid urbanization with the economic growth has a new face of vector control strategies. Many endemic species have evaded in many areas with this mechanism. Application of newer insecticides, ITN, larvivorous fish in different settings have resulted a new hope on the vector control front. Current application of Integrated Vector Management will surely overcome the many problems faced. Above all, community participation and linkages have to be taken into consideration for effective implementation and outcome.

**ADSORPTIVE REMOVAL OF ORGANICS AND INORGANICS FROM WASTE WATERS USING INDIGENOUS SOURCES: AGRICULTURAL SOLID WASTES****C. NAMASIVAYAM**

Industrial growth and associated technical sophistication in the last three decades or so has posed major problems of solid waste disposal. It has become essential either to find suitable ways for the safe disposal of the wastes or to suggest novel uses, considering them as by-products. Otherwise these will remain an accumulated waste, contributing highly to environmental pollution. The choice between recovery of valuable materials from waste and disposal of waste depends mainly on three factors: technology, economics and attitude. In developing countries like India, industries cannot afford to use conventional wastewater treatment chemicals like alum, ferric chloride, polymer flocculants and coal based activated carbon because they are not cost-effective. Among the treatment methods adsorption seems to be an effective method. An inexpensive and more easily available adsorbent would make the removal of pollutants an economically viable alternative. Agricultural wastes like orange peel, banana pith, coir pith, peanut hull etc. are discarded in the agricultural sector. These wastes contain cellulose and lignin, which act as very good adsorbents. Namasivayam and coworkers have investigated to recycle these agricultural solid wastes as adsorbents with and without chemical modification for the treatment of industrial effluents. Physically and chemically activated carbons derived from coir pith, peanut hull and Jatropha husk; and wastes such as biogas residual slurry, banana pith and orange peel were found to be efficient for the removal of dyes, toxic metal ions and anions from industrial wastewaters. Results of batch mode adsorption studies using the above adsorbents and applications to the treatment of real industry effluents will be presented in this lecture. Kinetics and temperature effects of adsorption will be discussed.

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IMPACT OF CLIMATE CHANGE ON ENVIRONMENT AND HEALTH

SOMASHEKAR R.K, RAVIKUMAR. P AND K.L.PRAKASH

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, wind, and other weather patterns, that lasts for decades or longer. Climate change is altering weather and climate patterns that previously have been relatively stable. Climate experts are particularly confident that climate change will bring increasingly frequent and severe heat waves and extreme weather events, as well as a rise in sea levels, which have the potential to affect human health in several direct and indirect ways, some of them severe. Climate change is the result of human behavior and choices. Solving the problem requires changing us - lots of us - as well as changing the policies that contribute to the problem. It is a significant and emerging threat to public health and can endanger human health and survival and change the way we must look at protecting vulnerable populations. The impacts of climate change on human health will not be evenly distributed around the world. Developing countries, populations, particularly in Small Island States, arid and high mountain zones, and in densely populated coastal areas, are considered to be particularly vulnerable. Fortunately, much of the health risk is avoidable through existing health programmes and interventions. Concerted action to strengthen key features of health systems, and to promote healthy development choices, can enhance public health now as well as reduce vulnerability to future climate change. Approximately 600,000 deaths occurred world-wide as a result of weather-related natural disasters in the 1990s; and some 95% of these were in developing/poor countries. For example, In October 1999, a cyclone in Orissa, India, caused 10,000 deaths. The total number of people affected was estimated at 10-15 million; In December 1999, floods in and around Caracas, Venezuela, killed approximately 30,000 people, many in shanty towns on exposed slopes. Climate-sensitive diseases are among the largest global killers. Diarrhoea, malaria and protein-energy malnutrition alone caused more than 3.3 million deaths globally in 2002, with 29 % of these deaths occurring in the Region of Africa. Continuing climate change will affect, in profoundly adverse ways, some of the most fundamental determinants of health: food, air and water, according to WHO Director-General Dr Margaret Chan. Areas with weak health infrastructure - mostly in developing countries - will be the least able to cope without assistance to prepare and respond. The changes that will be brought by climate change, which have the potential to affect human health in several direct and indirect ways, some of them severe are *Increasingly frequent and severe heat waves, Extreme weather events, Rise in sea levels*. Potential effects of this climate change are likely to include more variable weather, stronger and longer heat waves, more frequent heavy precipitation events, more frequent and severe droughts, more intense storms of extreme weather events such as flooding and tropical cyclones, hurricanes, rises in



sea level, and increased air pollution. Impact on Air can lead to Increase in the density of Aero-allergens, Increase incidence of Respiratory Diseases, Extreme Weather Events may affect the system, Heat Waves may impart unwanted impacts, Mental Health could be affected, Vector-borne and Zoonotic Disease may zoom, Water- and Food-borne Diseases, Other Indirect Health Effects likely to be produced by Climate change include wildfires resulting from more frequent and prolonged drought; conflict over water and other scarce resources; mass population movement; and Ecosystem changes includes Migration of the vectors (organisms that do not cause disease but transmit infection by carrying pathogens from one host to another) and animal hosts that cause certain diseases increased ocean acidity, resulting in severe stress on ocean ecosystems, particularly in the tropics. Increased ambient temperatures over land and increased ground-level carbon dioxide concentrations result in increased plant metabolism and pollen production, may also be associated with increased fungal growth and spore release. Pollen and mold spores are allergens and can aggravate allergic rhinitis and several respiratory diseases, including asthma and chronic obstructive pulmonary disease, though the latter diseases have other significant triggers. Some experts have suggested that the global rise in asthma is an early health effect of climate change. $PM_{2.5}$ s are generated by a range of sources, but primarily from the burning of fossil fuels and are likely associated with respiratory and cardiovascular diseases, including asthma, COPD, and cardiac dysrhythmias. The other actions and the resulting damage include, Increased demand for electricity and thus combustion of fossil fuels, generating airborne particulates and indirectly leading to increased respiratory disease. Increased concentrations of ground-level carbon dioxide, increased carbon dioxide concentrations in sea water may cause oceans to grow more acidic and is likely to contribute to adverse ecosystem changes in the world's tropical oceans. This would have potentially dramatic implications for fisheries and the food supply in certain regions of the world. Longer growing seasons could result in higher pollen production, worsening allergic and respiratory disease. Major regional ecosystem stresses may result in mass population movement and conflict, with significant health effects. Some of these concerns are low-probability high-impact events, and could have significant health impacts on a global scale. The paper also discusses the strategies planned at global level by WHO and member states in protecting public health from the impacts of climate change



EFFECT OF GENETIC AND EPIGENETIC MODIFICATIONS OF TUMOR SUPPRESSOR GENES ON SUSCEPTIBILITY TO CERVICAL CANCER IN NORTH INDIAN POPULATION

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Human papillomavirus is considered to be a major etiological factor but is not sufficient for the development of cervical cancer. Other host factors including altered tumor suppressor gene activities might contribute to the carcinogenic process. Therefore, we investigated the aberrant promoter methylation of *FHIT* and *RASSF1A* genes and also mutational analysis of *FHIT* gene in HPV mediated cervical cancer in Indian women. Methylation Specific PCR (MSP) was performed to analyze the methylation status of *FHIT* and *RASSF1A* genes. PCR-SSCP was performed for detection of *FHIT* gene mutations. Both the techniques were confirmed by sequencing. Both patients and controls were screened for Human Papillomavirus (HPV) infection and 98% of the HPV infected cases showed positivity for HPV type 16. *FHIT* promoter region was found to be aberrantly methylated in 28.3% (17/60) of cases and showed significant association ($p < 0.01$) with cases whereas 35.0% (21/60) of cases ($p < 0.01$) were found to be methylated for *RASSF1A* gene but 13.3% (8/60) cases methylated for both. None of the 23 controls was found to be methylated for any of these genes. We found a novel mutation identified at nucleotide position 655, at codon 98 from CAT to CGT with ultimate replacement of amino acid Histidine by Arginine in cervical cancer cases. Molecular modeling was performed to predict the effect of this mutation in disease pathology. We predict that this change, His to Arg substitution in substrate binding domain may generate catalytically inactive protein with loss of tumor suppressor activity. Future studies are underway to examine the practical implications of these findings.

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**COAL WORKERS' PNEUMOCONIOSIS IN UNDERGROUND COAL MINES IN INDIA**

P K GANGOPADHYAY

One of the most important sources of energy in India is the fossil fuel, Coal which contributes for about 60% of our commercial energy requirement. Production of coal is being augmented due to increased demand & the miners are likely to develop pneumoconiosis due to their prolonged exposure to the working environment. This study was undertaken to find out the magnitude of pneumoconiosis in the Eastern Coal Fields (ECL). For diagnosis of coal workers' pneumoconiosis chest X-ray (PA) view was taken in 300 mA X-ray machine with appropriate Kv with or without grid in standard sized X-ray film. The X-rays were interpreted and classified by three independent readers by comparing with standard ILO films (1980).

This study covered 3626 underground coal miners from 25 mines of 6 zones of ECL. They were clinically examined and the reports of their Chest X-rays interpretation were presented here for 3611 subjects. The dust concentrations (both personal exposure and work environment of different operations) were within permissible limit. The mean age and duration of occupational exposure were 45.23 ± 9.03 years and 21.90 ± 8.61 years respectively. The prevalence of definite and suspected pneumoconiosis were 3.02% and 9.86% respectively. Percentage prevalences of pneumoconiosis were variable for different job specifications. Both rounded and irregular opacities were mainly found in the mid and lower zones of the lung fields, distribution was more in right lung. The prevalence was more in smoker and past smoker than that of non-smoker. The prevalences were seen to increase with increase of age and work duration. With the increase of dust year the percentage prevalence of pneumoconiosis showed an increase. The job specific dust concentration did not seem to bear any relation of development of pneumoconiosis. Higher categories of pneumoconiosis could not be detected with exposure up-to 40 years. The presence of different symbols as per ILO classification revealed that mainly tb and em to the extent of 7.98% and 2.30 % respectively.



ARSENIC CONTAMINATION IN GROUND WATER: HEALTH EFFECTS, CYTOGENETIC AND MOLECULAR APPROACHES TO IDENTIFY ARSENIC SUSCEPTIBILITY

ASHOK. K. GIRI

In West Bengal, India the ground water of several districts is contaminated with. Although about 7 million people are exposed, less than 15% individuals are showing arsenic induced skin lesions. It is assumed that genetic variation might play an important role for this arsenic susceptibility. We have assessed the arsenic induced health effects, immunological, hematological effects and genetic damage in the symptomatic (individuals with arsenic skin lesions) and asymptomatic (individuals with no arsenic skin lesions) individuals exposed to same arsenic contaminated water using cytogenetic parameters. Single nucleotide polymorphisms (SNPs) studies were carried out for *GST* group genes, *p53*, *PNP* and *ERCC2* as they might be involved arsenic metabolism and detoxification. The incidence of neuropathy, eye problem and respiratory diseases as also immunological and hematological effects were significantly high in the symptomatic and asymptomatic group when compared with unexposed group. Incidence of health effects was significantly high in symptomatic group than the asymptomatic group. Frequency of MN in all 3 studied cell types and the CA in lymphocytes were significantly higher in symptomatic group than the asymptomatic group. Distribution of homozygous *GSTT1* null genotype, *p53* codon 72 Arg/Arg genotype, *ERCC2* codon 751 Lys/Lys genotype and three SNPs of *PNP* were significantly high in the symptomatic compared to that of the asymptomatic individuals. The risk genotypes of *ERCC2* and *p53* SNPs were positively correlated to genetic damage compared to the referent genotypes. Challenge and Comet assay proved that the individuals with arsenic-induced skin lesions had suboptimal DNA repair capacity. Thus, sub-optimal DNA repair coupled to genetic variations are responsible for arsenic-induced toxicity and carcinogenicity.

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**AN OVERVIEW OF OECD GUIDELINES FOR GOOD LABORATORY PRACTICES (GLP)**

P. BALAKRISHNA MURTHY

OECD (Organization of Economic Co-operation and Development) is an organization where countries come together to co-ordinate and harmonize policies, discuss issues of mutual concern and work together to respond to international issues. Like EU (European Union) OECD member countries work on the basis of consensus in the area of control of chemicals to ensure protection to man on environment. OECD brought out guidelines in the year 1981 for testing of chemicals, following fraud detection of safety data by US FDA. They were revised subsequently in 1997, and the purpose of this presentation is to give you an overview of these two documents (OECD website (www.oecd.org)). OECD published 15 documents so far. Each of these documents addresses specific components of GLP. The principles of GLP are applied to all non-clinical health and environmental safety studies required by regulations for the purpose of registering and licensing drugs and pharmaceuticals, pesticides, cosmetics, veterinary drugs, food and feed additives, biocides and others. The principles are not intended for laboratory involved in basic, academic and discovery research.

The following are the crucial aspects of GLP: 1) Test facility management, 2) Infrastructure, equipments, supply, animals and husbandry, 3) SOPs, 4) Study Director and supporting staff and training, 5) Quality Assurance, 6) Document control, 7) Archives and retention of records, 8) Indian National GLP Monitoring system

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POTENTIALS OF NEW NANOMATERIALS IN BIOPHYSICS AND BIOELECTRONICS AS DIAGNOSTICS

AITHAL K.S.¹, POORNESH², M.THUKARAM³, ASHOK RAO⁴

Nanomaterials are used in various forms viz; particles, films, tubes, wires, crystals, composites, ceramics, fluids etc for various specific properties attributed to them which include magnetic, electric, physical, chemical, mechanical, optical, superconducting etc., These properties are utilized for their new applications in science, technology and biology including medicine. Certain selected inorganic materials including metals and their oxides, carbon, silicon and graphite and also certain selected organic molecules are used as nanomaterials. Selected bio-molecules are found to bind with certain selected synthetic molecules and utilized in biological applications. In this paper the most commonly used nano-carbon, silicon, certain rare earth metals, Sn, Zn, Sb, Al, B, Ti, Cu, Mg, Ag, Ca and their oxides; certain selected organic molecules conjugated with bio-molecules, organisms used in the applications in biophysics, bioelectronics as transducers and diagnostics and therapeutics in medicine will be discussed. Special reference will be made in cancer diagnostics and therapeutics. Nanomaterials are also used as immunomodulators, neurotransmitters and as devices for the diagnosis of diabetic, neurological disorders. Magnetic nanomaterials used as drug carriers for site specific drug delivery and improved CT and MRI diagnostics. Citation of nanosensors in industries include, water purification, detection of atmospheric pollution, energy devices Ni-Cd battery, solar cells, sensors in automobile, computer and laser applications will be reviewed. Use of nano-robotics in drug targeting and visualizing the internal structure of the organs and their defective sites will be discussed. A recent research by our group on the study of human fat revealed the possible early detection and control of obesity using reverse bio-engineering. Adipose tissues containing human fat could be good candidate as a sensor. The composition of fat is found to be non-uniform over various parts of the body which needs further probe into the biochemical pathways and the neural signal networking in the deposition of the fat in human.

Keywords: nanomaterials, bioelectronics, biophysics, biomaterials, sensors

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**GENOTOXICITY STUDIES IN LEATHER FACTORY WORKERS: OCCUPATIONAL HEALTH HAZARDS**

RADHA SARASWATHY¹ AND MARIMUTHU. K. M²

Occupational exposure represents the foremost source of contamination in human living. Many people are occupationally exposed to various biological, physical and chemical biohazardous agents, which include microorganisms, radiation, smoke, dust, fumes, inorganic and organic chemicals. This may eventually lead to serious health conditions which may be irreversible. The Leather Industry in India is one of the leading production sectors in the country and the Footwear Industry in particular, is a significant segment in this sector. India ranks second among the footwear producing countries next to China. TamilNadu has the highest concentration of large and small-scale production units. Over the years, studies have shown that employment in the leather production units is associated with various diseases caused by biological, toxicological and carcinogenic agents. The specific disease associated with exposure in the leather industry depends upon the extent to which the worker is exposed to the agent(s), which is dependent upon the occupation and work area within the industry. Industrial exposure over a prolonged period is likely to influence the genetic mechanism of cell growth and multiplication in the body. These genetic effects are likely to be reflected in the chromosomes of workers and this provides the hypothesis for the investigation of the chromosomal nature of the same. The present study group included 20 male tannery workers and equal number of control subjects age matched and with no history of occupational exposure to tannery chemicals. In order to assess the degree of genetic risk of workers, it was decided to carry out a study to analyse their chromosomes for frequency of aberrations from cultured peripheral lymphocytes and genotoxicity studies were also carried out by measuring Sister Chromatid Exchanges (SCE) in the chromosomes.

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DUST LEVELS AND HEALTH EFFECTS AT THE BAZHENOVSKOYE CHRYSOTIL ASBESTOS DEPOSIT

KASHANSKY S.V

80 years Yekaterinburg Medical Research Centre carried out monitoring of dust levels and health effects at the world's largest Bazhenovskoye chrysotile asbestos deposit. During this period established that all the technological operations of chrysotile asbestos mining and milling are accompanied by the formation of high-disperse asbestos-contained disintegration aerosols. The analysis of dust content at the miners and ore dressing working places has proved to the fact that the concentration at the absolute majority of the working places in mines for the last 38 years (1970-2008) were at the level or below of Russian maximum allowable concentrations – 4.0 mg/m^3 and fibres concentration was 0.2 f/cm^3 . At ore dressing at the working places exceeded concentrations 2-3 times the Russian maximum allowable concentrations (2.0 mg/m^3) and fibres concentration was 1.8 f/cm^3 . Improvements of technological processes along with medical and preventive measures taken at the Bazhenovskoye deposit during the past 48 years (1960 – 2008) resulted in a 10 to 100-fold decrease in Russian maximum allowable concentrations and, therefore, in the lowering of asbestosis, lung and stomach cancer risks. From 1981 till 2008 only 6 cases of the malignant mesotheliomas was diagnosis including 5 malignant pleural mesotheliomas and one case of the pericardium mesothelioma are registered. The efforts to control the health hazards of various chrysotile dust concentration have focused on a strategy of clinical surveillance and controlling exposures yielding results that indicate controlled using. The experience obtained in the course of medical and hygienic studies carried out by Yekaterinburg Medical Research Centre at Bazhenovskoye deposit may serve as a good basis for substantiation of safe allowable controlled application of chrysotile asbestos.

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**ANIMALS ARE ADAPTED FOR DIFFERENT ENVIRONMENTAL STRESSORS: EVIDENCES FROM LABORATORY EXPERIMENTS**

VASUDEV.V, H.P. GURUSHANKARA, V.P. MAHADIMANE AND B.B.D. KHALANDAR

Increased environmental pollution can be attributed to a variety of factors resulting from new industrial and agricultural technologies. All the progress and advances in the field of science and technology led to the exploitation of nature with the production of pollutants. DNA being primary target for these pollutants, the genetic integrity of all organisms is subjected to varied assaults which in turn result in genetic diseases, cancer and death. The DNA damaging agents include radiations like UV, X rays and Gamma rays and synthetic and naturally occurring chemicals like Drugs, Cosmetics, Food additives, Pesticides, Industrial effluents, Chemical warfare etc. However all the damages caused may not be expressed or may not result in genotoxicity, as there are inbuilt mechanisms to overcome these effects. They are unique defense machineries known as DNA repair mechanisms. These mechanisms have been evolved to minimize genotoxic damages that are formed in normal cells. Adaptive response is one such mechanism which is novel error free inducible DNA repair pathway. This was first described by Samson and Cairns in *E. coli* (1977). They concluded that exposure of cells to relatively small dose or conditioning dose of a mutagen/toxicant increases more resistance to higher killing challenging dose of the same mutagen. This discovery paved ways for extensive research in understanding the process of adaptive response in prokaryotes and *in vitro* eukaryotes using different physical and chemical stressors. The same phenomenon was reported in the cells of higher plants by using alkylating and non-alkylating agents. We have also demonstrated in our laboratory the occurrence of adaptive response in *in vivo* meiotic cells of *Poecilocus pictus*, mitotic cells of mouse and *Drosophila* and *in vitro* cultures of human lymphocytes. The results of ours corroborates with that of prokaryotes, *in vitro* cultures and plant systems and these results strengthen the hypothesis that the adaptive response is conserved in different living cells and the intricacies involved in it will be discussed.

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ENVIRONMENTAL HEALTH AND OCCUPATIONAL HAZARDS

SRINIVASAIAH. H

In the 21st Century the issues of environmental health and occupational hazards are occupying center stage the world over. This is because they are responsible for an unreasonably large number of illness, deaths and occupational diseases. It has become necessary to protect the safety, health and welfare of people engaged in any given occupation as these issues have far reaching implications. Their ripple effect adversely affects co-workers, family members, employers, the community and the public at large. Limiting these issues only to the occupational would cause greater harm than good. The issues need to be reviewed in a cross disciplinary angle and in tandem with other related areas including occupational medicine, occupational hygiene, public health, safety engineering, chemistry, toxicology, epidemiology, sociology, psychology etc. In spite of the vociferous efforts made by international organizations, individual countries, trade unions, employer's organizations and the NGO's majority of the policy objectives on these key issues have remained only as 'resolves' or 'intention' on paper with inadequate implementation. The environmental health and occupational hazards are not static in nature, it is therefore essential that these issues are considered and modified taking into consideration the rapid changes in economic structures, technology, demography and new additions with the hazards arising out of "nano" materials. With the present scenario, the international organizations like ILO and WHO must provide necessary stimuli and support the member states in framing, publishing and implementation of policies and programmes at a quicker pace. In the last decade or two, the developing and the under-developed countries have witnessed massive growth in industrial activity and consequently the issues related to environmental health and associated occupational hazards. According to one of the survey conducted by the ILO, there are around 125 million occupational accidents, out of which 220,000 resulted in fatality, 10 million suffered from crippling injuries and an estimated 500 million workers contracted occupational diseases. The other related survey states that 4% of the GDP is spent by countries in paying compensation to the victims. This is an unreasonably large amount. The statistics are mind-boggling since these work related accidents and illnesses are causing more deaths, injuries and psychosocial problems than wars.

It is unfortunate that the developing countries do not have any significant policies on the issues concerned. We are running against time. It is imperative that the Government at all levels establishes environmental health standards that are prudently protective against all vulnerabilities. This assumes greater significance as the issues are intrinsically linked to quality of life and protection of environment. It is time that we should look for adoption of greener technology. Producers should be urged to take initiatives to shift from products and chemicals, which are hazardous to, less hazardous or non-hazardous. This would comply with the definition of ILO and WHO which have a common goal of "promotion of occupational health and maintenance of highest degree of physical, mental and social well being of all, in all occupations".

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**CASH - AN INNOVATIVE APPROACH TO SUSTAINABLE OCCUPATIONAL HEALTH & WORK ENVIRONMENT IMPROVEMENT**SHYAM PINGLE¹ & SHRINIVAS SHANBHAG²

Most enlightened managements struggle to enlist employee participation in occupational safety and health by using various techniques, but success is often elusive. Project CASH is a success story of employing an innovative strategy to achieve positive employee attitude towards OSH and voluntary participation of workers in HSE efforts which resulted in sustainable improvement in work environment and work practices of employees while making a strong business case of OSH. A new initiative called CASH was launched in 2003 at Reliance Industries Ltd wherein employees were urged to become Change Agents for Occupational Safety, Health and work environment. Multidisciplinary teams of Change Agents were constituted and were given intensive training inputs. Reduction in exposure to Noise, Dust and Heat Stress were identified as specific objectives after a baseline survey of the work environment. Knowledge and training on Occupational safety and health was imparted to all field personnel to improve their work practices and attitudes. Training and bench marking were the two important tools employed in the strategy. Employee buy-in was ensured by getting volunteers, giving training on Occupational Health, selecting projects based on employees' appreciation of the need to improve their own work environment and finally getting these projects done thru the same team members. Final evaluation of workplace environment revealed significant reduction in exposure to all identified hazardous agents viz; noise, dust and heat. Educating and empowering the team led to reduction of occupational health risks in the work environment. There was positive attitudinal and behavioral change in safety and occupational health awareness & practices among employees. The monetary savings resulting from improvements far outweighed the investments. The best group was rewarded thru a trophy named after the founder Chairman of the company given away at a ceremony in presence of top leadership of the organisation. These projects made a significant improvement in the areas of noise, heat, dust, chemical exposures and ergonomics. Over the last 5 years this project has been successfully implemented across various sites of the Reliance group. The project has created a change in the OHS culture across all sites of the company. There are clear indicators that creating awareness and empowering the operating personnel are key factors in implementing any programmes related to occupational health. Training, benchmarking, top management commitment played a major role in initiating the change. The Reliance experience also proves that occupational health pays for itself and doesn't require additional investments for controlling workplace environments. We have also learned that implementing such innovations, interventions and projects is a win-win prospect and makes good business sense. These have not only resulted in substantial change in attitude of employees but also added to the bottom line of the company. This has now become a movement across RIL group companies and there is a healthy competition amongst all sites and Plants to get the coveted trophy. This has propelled RIL into global leadership in the field of Occupational and Environmental Health.

The presentation gives an overview of the success story with practical examples.

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POTENTIAL OF ENERGY SAVING IN I. R. IRAN

KARBASSI, A. R. & NABI BIDHENDI, GH. R.

Energy efficiency measures can play an important role in the greenhouse gases (GHGs) reduction and also local air quality. In the present investigation, the potential of electricity saving computed for I. R. Iran. It should be pointed out that energy intensity in Iran is almost 4 times higher than the world's average. Our estimation shows that implementation of good practices home appliances can lead to significant energy saving. At the present about 22 million freezers and refrigerators are operating within Iran. If the energy consumption of these appliances promoted from present "D" level to "A" level; about 3000 MW power plant will be freed. Also the present efficiency of electrical motor in evaporative coolers is about 52% that can be promoted to at least 75%. Such measure would free a power plant of 1000 MW capacity considering the consumption of 11 million evaporative coolers in Iran. The most efficient measures to achieve the above goals are to develop the National Energy Laboratory where all the home appliances should be checked and labeled for energy consumption. At the same time information dissemination as well as public awareness should be implemented to assure the effectiveness of the activities. In the present paper apart from the above cited home appliances the other equipment such as washing machines, pumps, compressors, irons, electric heaters and chillers will be discussed. The established platforms for measurement of energy consumption by various home appliances will be discussed and the future plans/need will be brought out. Transfer of technology amongst Asian countries is the key point in effective promotion of energy saving programs.

Keywords: Energy saving, home appliances, Global warming, technology, awareness

THE RELENTLESS RISE OF NEOALLERGENS IN ENVIRONMENT

MANJUNATH K

Most people in developing countries are exposed to high levels of pollution everyday. Exposure to environmental pollutants accounts for the increased prevalence of allergic diseases in the industrialized world too. Bioaerosols are colloidal suspensions of solid particles or liquid droplets in the air and are particles of variable biological origin, e.g. pollen, fungal spores or fragments of fungal mycelium, bacterial cells, viruses, protozoa, excreta or fragments of insects, skin scales or hair of mammals, or other components, residues or products of organisms such as bacterial lipopolysaccharides, i.e. endotoxins or fungal mycotoxins, microbial volatile organic compounds. Biotechnological industries are releasing ever increasing number of recombinant "novel" proteins to the environment. By adhering to the surface of these bioaerosolic allergens, air pollutants could modify their antigenic properties. For example, through physical contact with the pollen particles, diesel exhaust particles can disrupt it, leading to release of paucimicronic particles and transporting them by air – thus facilitating their penetration of the human airway. An enhanced IgE mediated response to these aeroallergens and enhanced airway inflammation favoured by air pollution accounts for increasing prevalence of allergic respiratory diseases. Indoor air pollution is responsible for nearly 2 million excess deaths in developing countries and some 4% of the global burden of disease. Apart from causing allergies, bioaerosols also cause infectious diseases, acute toxic effects and cancer. Increase in these neoallergens is a major global public health threat requiring greatly increased efforts in the areas of research and policy-making.

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CANCER RISK ASSESSMENT DUE TO INTAKE OF RADIONUCLIDES THROUGH THE INGESTION OF CEREALS AND PULSES AROUND BAGJATA URANIUM MINING AREA, JHARKHAND, INDIA

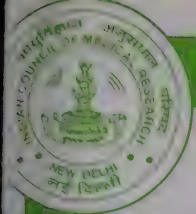
SOMA GIRI¹, GURDEEP SINGH¹ AND V.N.JHA²

Ingestion of radionuclides through drinking water and food intake accounts for a substantial part of radiation doses to various organs of the body and represents one of the important pathways for long term health considerations. Pulses and cereals are essential foodstuffs for human diet. Radionuclides can be apprehended in the ecosystem of the East Singhbhum region which is known for its viable grades of Uranium. For the risk assessment studies twelve samples of cereals and pulses were collected from the villages around Bagjata mining area and analysed for U(nat), ²²⁶Ra, ²³⁰Th and ²¹⁰Po. Analysis of the results of the study revealed that U(nat), ²²⁶Ra, ²³⁰Th and ²¹⁰Po varied from <0.017-0.16, <0.02-1.58, 0.09-2.8 and 0.19-11.1 Bq.kg⁻¹ for cereals and 0.11-0.39, 0.03-0.47, 0.07-0.59 and 5.64-34.31 Bq.kg⁻¹ for pulses respectively. The intake of the radionuclides from cereals and pulses was found to be 347.48 and 155.7 Bq.Y⁻¹ while the ingestion dose was calculated to be 80.57 and 36.85 μ Sv.Y⁻¹ respectively. The estimated doses are reflecting the natural background dose via the route of ingestion, which is much below the 1 mSv limit set in the new ICRP recommendations. It is lower than the global average annual radiation dose of 2400 μ Sv to man from the natural radiation sources as proposed by UNSCEAR. This article is not included in your organization's subscription. However, you may be able to access this article under your organization's agreement with Elsevier. The data has been used for the cancer risk assessment by USEPA method. The total cancer risk due to the consumption of cereals and pulses was calculated to be 6.4×10^{-8} which is negligible and much lower than the threshold risk value of 1×10^{-6} . However, the risk was more for cereals (3.93×10^{-8}) than pulses (2.47×10^{-8}).

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ANTIPROLIFERATIVE AND APOPTOTIC ACTIVITIES FROM MARINE ALGAE

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South East coast of India is rich in Green, Brown and Red algal flora, some are found growing throughout the year and some others only during certain seasons. Two algae namely, *Gracilaria corticata* (a red alga), and *Caulerpa scalpelliformis* (a green alga), collected from the South East coast have been used in the present study. In the present study, antiproliferative and apoptotic effects of the methanolic extracts of these two algae on Human laryngeal epidermoid carcinoma (Hep 2) cell lines are investigated. The antiproliferative and additionally apoptotic effects of both *G.corticata* and *C.scalpelliformis* extracts on Hep 2 cell lines have been shown in the present study. The IC_{50} values have been determined. Concentrations of 50 μ l / well could induce apoptosis in *G.corticata* whereas the concentration was still lower with extract of *C. scalpelliformis*. Percentages of apoptosis range from 50-90%. In conclusion, the present study shows the antiproliferative and apoptotic effects of *G.corticata* and *C. scalpelliformis*. Compared to an anticancer drug, the extracts might be considered as an alternative native source of antitumour drugs.

TYPES OF GAMMA RADIATION INDUCED DNA DAMAGES IN THE FISH *OREOCHROMA MOSSAMBICUS* AS REVEALED BY THE CYTOME ASSAYANBUMANI SADHASIVAM AND MARY N. MOHANKUMAR

The International Commission on Radiological Protection (ICRP) has recently emphasized the need to protect non-human biota from the potential effects of ionizing radiation. Systematic studies using sensitive biomarkers are required to assess doses that can cause significant DNA damage in representative non-human species. The erythrocyte micronucleus assay (Cytome assay) is a simple and sensitive technique for the *in vivo* evaluation of various environmental pollutants. In the present study an attempt was made to identify DNA damages induced by high doses of gamma radiation using the cytome assay. To identify various types of DNA damage as seen in cytome assay and compare it with damage induced by chemicals and thereby identify a potential biomarker of radiation exposure in a sentinel organism. *Oreochromis mossambicus*, a commonly available fish around the year in the ponds and rivers that inhabit the freshwater ecosystem were collected from the Kalpakkam environment. Fishes were acclimatized in the laboratory in glass aquaria for 10 days along with continuous aeration and food *ad libitum*. Acclimatized fishes were exposed to 0.5 Gy and 1 Gy gamma radiation in a gamma chamber. Peripheral blood smears of exposed fishes were prepared and 3000 cells per slide were scored to analyze radiation induced micronuclei and other abnormalities by the cytome assay. The various types of abnormalities observed in cells exposed to high doses of ionizing radiation were micronuclei, deformed nuclei, binucleated cells, nuclear buds, nuclear bridges and lobed nuclei. Compared to abnormalities induced by chemicals, reported by others, nuclear buds and nuclear bridges appear to be characteristic of ionizing radiation.

EVIDENCE FOR BYSTANDER EFFECTS IN HUMAN CELLS EXPOSED TO LOW DOSES OF RADON

MEENAKSHI. C AND MARY N. MOHANKUMAR

Radon is a naturally occurring alpha emitting radioactive gas present in the atmosphere, homes, workplaces and areas with high natural background radiation. Moreover, radon is the second major cause of lung cancer. The induction of DNA damage in cells that are not directly traversed by a charged particle but are in close proximity to them is termed 'Bystander effects' and is contended to be significant at low doses. The occurrence of 'Bystander effects' challenges the linear; no threshold dose response currently being followed in radiation protection to estimate cancer risk due to ionizing radiation. To study the Bystander effects in human blood cells exposed *in vitro* to low doses of radon Blood samples from healthy individuals were exposed *in vitro* to low doses of radon ranging between 0.9-5.2mGy and 17-127mGy using a simple, portable irradiation assembly designed and tested at the Radiological Safety Division of IGCAR. Chromosome aberrations in giemsa stained first division metaphase preparations were scored. A significant increase in the frequency of dicentrics was observed at between 0.9-5.2mGy compared to doses ranging up to 127mGy indicating bystander effects present in low dose exposures which is not significant at high doses.

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ASSESSMENT OF HEALTH RISK FROM PAH EXPOSURE IN THE AMBIENT AIR

PAPIYA ROY, GURDEEP SINGH, A. K. PAL

Polycyclic aromatic hydrocarbons (PAH) are widely distributed in the environment of which some are carcinogenic to human beings. Seasonal variations of 7 polycyclic aromatic hydrocarbons (PAHs) were evaluated in the Talcher Coalfield Area of Orissa. These PAHs were associated with particulate matter and the evaluation was done over three seasons throughout 2007-2008. The fraction of fine particles ($<PM_{10}$) concentrations had a range of 51-189 $\mu g/m^3$. The detection and quantification of PAHs compounds were carried out using GC-MS. Results indicate elevated levels of PAH concentrations in the colder seasons. Contour maps showed high concentrations of indicator PAHs for gasoline and diesel engine sources distributed along the road network in the area. Total PAH exposure levels were higher than the current permissible limits, thus exposing people to higher risk of long-term effects of PAHs. Moreover, the risk of lung cancer associated with the above PAH exposures were elevated than the significant risk level i.e., $R > 1.0 \times 10^{-6}$ even at the median level defined by US EPA. This confirms that such exposures could not be accepted at this stage.

Keywords: PAH, Seasonal variation, Spatial distribution, Health risk.

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**DIAGNOSING DIABETES BY FINGER PRINT METHOD - A PRELIMINARY STUDY**

THANGIAH. S¹, NEPHY T S DHARSHINI², FATHIMA JANATHULLA FIRDOUZE³,
A. VIJAYASHANTHI³, M. PALANIVEL³, K. KALAISELVI³

The current study addresses a novel method of diagnosis of diabetes. The left thumb print was obtained from 1000 population of selected hospital entries for the treatment of diabetes mellitus. They are of various age groups with different sex, weight and blood group. The indirect study of urine analysis was carried out and the blood glucose level was measured. The observation of the study showed that out of 1000 population 570 members left thumb impression possess LOOP TYPE and pointed towards the medial side, most of them are having the left loop thumb impression. Around 400 populations belong to 'O' positive blood group. The indirect analysis of urine samples was also positive for diabetes. This study shows that there is a significant relationship between thumbprint and the diabetes. Hence this study concludes that thumb impression type of fingerprints is worthwhile to diagnose diabetic even in the early life and it can be rectified by the modern methods of GENE repair. It is a non expenditure type of diagnostic method and also it is useful to find out the reason of death after the postmortem.

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HUMAN HEALTH AND HEAVY METALS IN SOIL

SAYADI M.H AND SHABANI.N

Soil contamination is caused by the presence of man-made chemicals or other alteration in the natural soil environment. The contamination of the top soil is serious from the standpoint of its direct impact on human health. This pollution consists mainly of contamination by toxic metals in connection with emissions from industry and transportation. Metals may be inhaled as dust and also ingested involuntarily through food and drink as well as would be absorbed through the skin. Metals are notable for their wide environmental dispersion from such activity; their tendencies to accumulation select tissues of the human body, and their overall potential to be toxic even at relatively minor levels of exposure. Some metals do not have a role in human body and some others as in the case lead, cadmium, mercury are toxic even at trace levels and also essential metals could be harmful at very high levels. The toxicity of metals commonly involves the brain and the kidney, but other manifestations occur. This paper focuses on exposure to the heavy metals lead, mercury, arsenic, cadmium, chromium etc. as they are arguably the most important metal toxins from a world as well as some additional remarks are also made regarding a few other metals of concern.

Keywords: Soil contamination, Heavy metals, Exposure, Disease



BUCCAL CYTOME ASSAY IN COMPUTER USERS

RAJKOKILA. K, SHAJITHANOOP. S, SRINIVASAN.G AND M.V. USHA RANI

Computers are widely used in recent years but their effects on human health are completely unknown. Computers emit both ionizing and non-ionizing radiation. These include visible light, Ultraviolet, Infrared, X- ray and Radio frequency emissions. However, computer emissions are often so low as to be immeasurable or are found to be significantly below recommended safety levels. A pilot study was carried out to determine the cytogenetic effects if any, due to radiation emitted from computers that may have on the health of computer users. Buccal cytome approach was adopted to investigate proliferate potential. The results revealed the induction of micronuclei in computer users which was six times higher than the controls. The increased number of binucleated cells indicates the genotoxic response which was 6.54 ± 1.16 and 3.19 ± 0.46 in subjects and controls respectively. Karyorrhexis and Karyolysis was also higher (30.6 ± 4.76 , 45.43 ± 5.6 in subjects 9.82 ± 0.76 and 29.11 ± 0.17 in controls). This study validates the use of a cytome approach to investigate DNA damage, cell death and cell proliferations in buccal cells.

OCCUPATIONAL DUST EXPOSURE AND RESPIRATORY IMPAIRMENT IN COTTON GINNING WORKERS

KAMALESH J. DUBE, SOPAN T. INGLE AND LALIT T. INGALE

Dust generated during the handling and processing of the cotton in ginning mills causes health to the workers. The purpose of the study was to determine prevalence of respiratory symptoms among the cotton ginning workers. The study was undertaken among the 188 workers of the 10 different cotton ginning located in Chopda and Dharangaon cities of Jalgaon district Maharashtra State. To determine the impact of cotton dust on the lung function of the workers spirometric analysis was conducted. Significant declines in forced vital capacity (FVC), peak expiratory flow rate (PEFR) and Forced expiratory volume in one second (FEV_1) were observed in the cotton ginning workers as compared to expected values. The decline in FVC, PEFR and FEV_1 was significantly associated with years of exposure ($p < 0.0001$). The analysis of questionnaires used to generate health information of workers resulted in identification and ranking of self reported respiratory problems. The data generated during the study shows that 57% of the cotton ginning workers having respiratory problems like chest tightness and chest pain and 35% of the workers having frequent coughing. The byssinosis symptoms observed among the workers shows significant relationship with period of exposure. We recommend the compulsory use of personal protective equipment by the cotton ginning workers and proper ventilation at the workplace environment. A regular periodic examination is necessary to measure the impact of particulate matter on the health of the cotton ginning workers.

Keywords: Dust dose, Cotton dust, PEFR, FEV_1 , FVC, Byssinosis Symptoms

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**FLUORIDE AND HUMAN HEALTH: A CASE STUDY IN ANGUL, ORISSA**

SUMAN, GURDEEP SINGH, A.K. PAL

The Angul region in Central Orissa is recognized as one of the hot spots of India in respect of industrial pollution. NALCO aluminium smelter producing 3.45 lakh tonne of aluminium/yr is one of the major industries producing fluoride. During aluminium smelting process fluoride in the form of gaseous and particulates is released into the ambient environment from molten cryolite bath. Particulate fluorides in the air around aluminium smelters vary in size from 0.1 mm to around 10 mm. These pollutants cause impact on human health. In this regard, a questionnaire survey was conducted on about 100 people to evaluate the impact on human health in the vicinity of the NALCO aluminium smelter. This was further compared with the medical records collected from different hospitals and dispensaries. The results indicated the higher prevalence of respiratory disorder (such as asthma and bronchitis) and arthritis (osteoarthritis and rheumatoid arthritis) on the exposed population. Thus, control strategy should be adopted to reduce the impact of industrial fluoride pollution on human health.

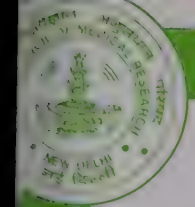
Keywords: Air pollution, Aluminium smelter Fluoride, Particulate, Gaseous,

AN INTERVENTIONAL STUDY ON KNOWLEDGE OF *BIRD FLU* AMONG SCHOOL STUDENTS IN KOLKATA

DWAIPAYAN MOJUMDAR, DEBJIT CHAKRABORTY, NARENDRANATH NASKAR, GOUTAM GHOSHAL

Bird flu is an upcoming health problem known to many of us. It is a serious occupational as well as public health problem. But proper knowledge of bird flu among people is questionable. Right now it spreads among birds in different countries. Human cases also reported in few countries. Last few years out break of bird flu among birds was reported different parts of India including West Bengal. For prevention of bird flu as well as to reduce unwanted panic enhancement of knowledge is essential among common people including our budding generation. From this perspective an institution based interventional study conducted among future generation of our society that is school student to assess their existing knowledge on bird flu and effectiveness of knowledge incorporated among them. For the aforesaid study a pre tested semi structured self reported questionnaire was given among 79 school students of two different classes in a school in Kolkata. Simple knowledge based intervention provided to near about half of them (randomly selected). After this intervention a post interventional knowledge assessment was done using the same questionnaire. On evaluating the result it is observed that pre interventional knowledge (Scores) difference is insignificant among both the groups. The results reveal that the improvement of knowledge (Scores) among groups which received intervention is highly significant ($p < 0.001$, $t_{38} = 15.07$). In other group improvement of knowledge is insignificant. It can well be suggested that this type of intervention shall increase awareness of prevention as well as reduce unwanted panic of bird flu.

Keywords: Bird flu, Knowledge, Intervention, School student



FLUORIDE INDUCED THYROID PROFILE DERANGEMENTS AND HEALTH IN SCHOOL CHILDREN OF BAGEPALLI TALUK OF CHICKBALLAPUR DISTRICT: A CUMULATIVE STUDY

MAHABOOB BASHA.P¹, N. MADHUSUDHAN, M.N. MANJUNATH AND FIYAZ AHMED

Fluoride is an essential trace element, plays a role in preventing dental carries and reducing tooth decay. However, excessive fluoride intake in our body for a long period may result in a serious public health problem. Fluorosis is an endemic public health problem in 23 nations around the world including India, where it is endemic in 17 out of 32 States and Union territories. Karnataka is also one among them. In Karnataka Kolar, Raichur, Tumkur, Gulbarga are greatly affected. Water samples from selected regions of Bagepalli taluk and volunteer high school children were assessed for the comprehensive survey. The assessment included fluoride content in water, socio-economic status, nutritional condition, academic achievements and clinical examinations- dental fluorosis, skeletal fluorosis and thyroid hormonal test. Bore well water from most parts of Bagepalli taluk do not suit for drinking as they exceed the permissible limit of fluoride. The most children affected with fluorosis by showing dental fluorosis, skeletal fluorosis, poor academic record and derangements in the thyroid profile and certain cases are worsened due to undernourishment. Hence alternate source water is required to overcome the fluorosis, as it is irreversible but only prevented.

Keywords: Bagepalli; Fluorosis; Thyroid test; Water

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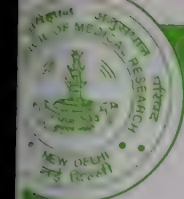
PERCEPTION OF SAFETY OFFICERS ON OCCUPATIONAL HEALTH SERVICES IN INDIA INDUSTRIES

GOURI SHANKAR BERIHA¹, BHASWATI PATNAIK¹, S.S MAHAPATRA³

This paper discusses an empirical research on workplace safety management performance in Indian industries. Perceptions and understandings of risk in occupational health and safety (OHS) among employers and employees influence the control of risk work. A study of risk perceptions and understanding in OHS was conducted among employers and employees in three sectors e.g. Construction, Refractories and Steel industries. A literature review was first made to identify and categorize hazards in routine management on these three sectors. A questionnaire survey was then conducted on three sectors covering ten industries. The factor analysis method was utilized and ten factors were extracted and interpreted. Finally identified factors were used in discriminant analysis to make more findings. Our findings show that perception of safety officers have positive influence on factors like injury avoidance, work practices, standardization, health care and risk management.

Keywords: OHS, Employee perceptions, Factor Analysis, Discriminant analysis, Work practices

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HAND INJURIES AMONG SEWING MACHINE OPERATORS

ANJALI NAG, VINITA VERMA, AND RACHNA SHAH

The garment manufacturing industry which employs approximately 3 million sewing machine operators in 70 thousand units is one of the largest unorganized sectors of industries in the country. The present study was undertaken to examine the prevalence of injuries in hands among sewing machine operators and to identify the probable association of work stressors and psychosocial variables in the occurrence of injuries. Standard interviewer-administered questionnaire and multi-method ergonomics checklist (interaction of the tasks with workers, the work methods and tools involved in job operation, workplace and working condition and incidence and pattern of hand injuries) were introduced among male (N=129, Age: 26 ± 6.7) and female (N=71, Age: 28 ± 8.9) sewing machine operators in small garment manufacturing units around Ahmedabad city. The structured interview covered mechanistic, biological, environmental, perceptual and motor, technical and psychosocial aspects of work. Analysis shows that about 46% of male and about 38% of female workers experienced hand injuries (fingers and palm) during work caused by sharp objects such as needles, scissors and cutters. Nearly one third of the total injuries culminated in moderate to severe injuries resulting in the loss of man-days and therefore productivity in turn. Males working >9 hours (OR 3.3; CI 1.5-7.3) in a day with Job tenure >5 years (OR 2.3; CI 1.1-4.6) were more vulnerable to injuries. Unsatisfactory man-machine complex, incompatible work place, hot environment and low task clarity were the likely contributory factors to the occurrence of hand injuries among sewing machine operators. Correlation matrix explained psychosocial variables like poor job satisfaction ($p < 0.05$), somatic anxiety ($p < 0.01$), and socio-domestic disruption ($p < 0.01$) among females had significant impact on the occurrence of injuries. Optimal man-machine and workplace compatibility may significantly minimize the risk potential of injuries.

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AIR POLLUTION ASSESSMENT IN URBAN AREAS AND ITS IMPACT ON HUMAN HEALTH IN THE CITY OF SHIVAMOGGA, INDIA

ADAMSAB M. PATEL¹, HINA KOUSAR, E.T. PUTTAIAH AND ALKADASI M. NOMAN

Nowadays, air over major cities throughout the world has become overburdened with gases produced by automobiles. The death rate due to automobile pollution is increasing rapidly in the metropolitan areas. With passage of time, people realized that polluted air has serious effects on their health, climate and economics. Weather and climate have integrated impact on human activities resulting in worldwide concentration of the particulates of environmental pollution viz., chlorofluorocarbons, carbon dioxide, methane, nitrogen oxide, lead and several other dusts and gaseous particles. Like many other mega cities in the world. The ambient air quality of Shivamogga city of Karnataka, is also deteriorating nowadays. Automobile exhausts and certain small scale industries produce O₃ by photochemical reactions. The particulate matter, particularly less than 10 μ in size, can pass through the natural protective mechanism of human respiratory system and plays an important role in genesis and augmentation of allergic disorders. The status of air pollution in the area has been evaluated and a questionnaire survey was conducted to estimate the allergic symptoms and exposure to assess the respiratory disorders and some of the other air pollution related diseases. The data are analyzed to evaluate the critical situations arising out of the emission of air pollutants and the impact on human health due to respirable diseases (RDs) in middle class sub-population (activity-wise) in the area assessed.

Keywords: Vehicular emission, Respiratory diseases, Dust, Small-scale industries.

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**BODY DIMENSION OF INDIAN CYCLE RICKSHAW PULLERS**

CHANDAN K. PRADHAN AND SRIDHAR THAKUR

In India, a population of about 0.86 million people is engaged in pulling cycle rickshaw as occupation. A number of anthropometric studies have been reported in India on agricultural workers and general population, however, no specific anthropometric data of cycle rickshaw pullers are available. The present study was carried out to collect their data. Anthropometric data for 34 body dimensions were recorded from the 952 rickshaw pullers (age 18 to 66 years) of five different places in India. The dimensions were recorded by using Anthropometer, spreading caliper, sliding caliper and flexible measuring tape. The data were compared with the result of other Indian studies. The mean values of different standing heights, different lengths and breadths were significantly lower compared to Indian population, however, there was no significant difference in erect sitting height when compared with Indian population. The outcome of the research project is beneficial for the manufacturers of cycle rickshaw as well as rickshaw pullers. The manufacturers would be able to use the data for fabricating newer model of cycle rickshaw which would be more comfortable for rickshaw pullers as well as passengers.

WORK-ENVIRONMENTAL ASSESSMENT AND BIOLOGICAL MONITORING IN A COPPER SMELTING PLANT IN INDIA

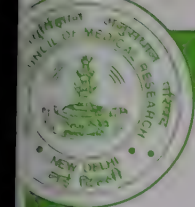
MUKHERJEE A K¹, RAVICHANDRAN B², BHATTACHARIYA SK¹, ROY SK¹, ROY RAGHAVAN S² AND RAO R²

Work exposure assessment of particulate matter (PM₁₀), sulphur dioxide, fluoride, As and Cu were carried out along with biological monitoring of Cu, As and F- among the workers in copper smelter, consisting primary and secondary smelters, refinery, sulphuric acid plant (SAF) phosphoric acid plant (PAP). Area monitoring of PM₁₀ was done by a real time direct reading monitor and also by low volume sampler. Work place SO₂ analysed titrimetrically by absorbing in H₂O₂ media and back titrating the excess acid as per IS-method. Fluoride was estimated by Ion Electrode method. Arsenic and copper in work-environment and biological samples estimated respectively by AAS-HG and flame AAS techniques. PM₁₀ in work-environment and personal samples found within permissible limit. The levels of SO₂ in different processes ranged between 1.3 mg/m³ - 8.23 mg/m³. The smelter and converter areas showed higher SO₂ levels than the prescribed TLV. Fluoride levels in its originating plant, PAP, found within the ACGIH TLV. Air arsenic levels ranged between 0.9 µg/m³ to 9.0 µg/m³ in different smelting processes including PAP and were within the ACGIH TLV. Gaseous arsenic was higher than particulate in both smelting and converter areas. The total air-copper (dust & Fume) ranged between 2.6 µg/m³ - 16.7 µg/m³, was within TLV and highest value obtained in converter area followed by casting. Workers' urinary arsenic levels varied between 9.66 - 34.87 µg As/g creatinine and hair and nail arsenic, between 0.55 - 3.98 mg/Kg and 0.26 - 6.25 mg/Kg respectively. Besides workers in plant-exposure to air-arsenic, exposure through dietary intake was also noticed. Pre- and post-shift urinary fluorides of PAP workers were observed within OSHA standards. The mean serum copper level of smelter workers was 64.67 ± 32.98 mg/dl. with only 1.8% of workers exceeding the normal range. The study revealed the toxic exposures in the copper smelter, mostly within permissible limits, which also reflected in the biological monitoring.

Keywords: ISA-smelter, Converter, Sulphur Dioxide, copper cathode, Phosphoric acid plant, Air arsenic, Urine fluoride, Serum copper

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**GENDER ISSUES IN OCCUPATIONAL HEALTH**ANNE JOSEPHINE G

Whatever be the environment of women, whether it is home or work place, women face many problems. Normally, women are considered as food producers, providers, and distributors at the household level, but it is women who suffer from nutritional deficiency disorders due to a gender bias. Women are affected by indoor air pollution, poor sanitary conditions and unhygienic atmosphere at home. Their woeful conditions prevail out of their domestic work place also. Women are bound to live with heavy work burden. Many studies show that women do heavier work than men and also work longer hours than men. During the course of their work, they forget their circumstances and become addict to work. Ultimately they are forced to forego their health and land into many health problems. Globally, it is true that both women and men suffer from health hazards related to work. Though men are exposed more risks at work, they are visible and based on them, there are studies available. In such a situation, women are the silent sufferers where the occupational health hazards are mostly latent. The main reason is their occupational health problems are overlooked and under estimated. Moreover women work force in an organised sector is not at all taken into account. All these contribute to more gender issues in occupational health hazards. Therefore it is high time to review the gender issues involved in the occupational health hazards. This paper will focus those issues related to gender differences in the work place and the need for a comprehensive policy for women's health at work place and the necessity of amendments in the existing laws related to occupational health and environment

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LIFESTYLE DISEASES AND OCCUPATION- A SOCIAL SCIENCE PERSPECTIVE

K. ASHA

Society is undergoing many changes due to various factors of urbanization, modernization and globalisation. There is a tremendous increase in the work participation, especially women. India has witnessed lot of changes in its economic front that has led to a great variety of diverse occupations. Work patterns have changed; facets of life are more defined from the point of work participation. Occupation has been a major determinant factor for one's lifestyle pattern. Occupation influences the dietary habits, exercise habits and sleep habits which have impact on the health of the individuals. The major health problems that arise out of lifestyle practice are those related to heart diseases, hypertension, diabetes, obesity, stress, musculoskeletal problems and many more. Lifestyle pattern differs in different socio-economic classes. The socio-economic statuses of individuals determine much of their lifestyle pattern. The choice of occupation an individual chooses depends on his/her socio-economic position. Education determines the nature of job involvement of the individuals. Since different kinds of occupations have different kinds of challenges associated with them, there is a need to understand the nature of jobs. Occupations have become a major determinant of life style patterns with growing changes and development in the society. The social fabric of the society has undergone a lot of changes with the influx of technology, new employment opportunities and related impacts in different aspects of life. This paper would analyse the need for a social science perspective to understand the various implications of the life style patterns that have arisen out of occupations. There is an urgent need to address the issue of life style diseases from this perspective to ensure a good quality of life for the individuals and to maintain a healthy society.



**ENVIRONMENTAL RISKS TO CHILDREN'S HEALTH**

LALITHA KUMARI. I.V

Every Child has the right to grow up in a Healthy home, School and Community. The future Development of our Children and of their world depends on their enjoying good health now. A Child's world centers around the home, school and the local Community. The biggest threats to Children's health lurk in the very places that should be safest – home, School and Community. Every year over 5 million Children ages 0-14 die, mainly in the Developing world from diseases related to their Environments – the places where they live, learn and play. This article highlights the Environmental risks the children exposed to and solution to prevent these risks to the Maximum extent, there by protecting and promoting Healthy Environment for better growth and Development among Children.

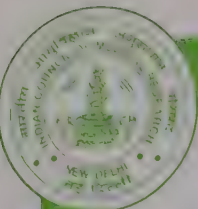
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BIO REMEDIATION OF METAL - CONTAMINATED INDUSTRIAL EFFLUENT

HELEN ROSELENE AND PRESHADA FERNANDES

An electroplating industry produces a variety of products ranging from military devices to dental instruments. The untreated effluent causes severe damage to the environment. These contaminants may also enter into the food chain and affect human health. Hence the effluent must be properly treated before letting out into the environment. In the present study, the effluent was collected from electroplating industry, assayed for physico-chemical properties. The algal species i.e., *chlorella* used for bioremediation study was isolated from Bellandur Lake which is highly polluted and this algae that survived extreme toxic environment was introduced into the electroplating effluent and observed for metal uptake. There was significant decrease in the concentration of the metals such as copper and chromium in the effluent within 72 hours which shows the role of *Chlorella* in bringing down the levels of toxicants. Hence algae can be used as an effective bioremediation organism to remove the heavy metals. Industries that discharge the effluent after primary treatment using chemical treatment process can further treat the effluent with algae in shallow oxidation ponds to remove the metal ions present in the primary treated water, which is cheaper than the chemical process. This biological method can be used as a secondary treatment process, which is rapid and cost-effective process.

Keywords: electroplating, *chlorella*, bioremediation, copper, chromium



PROCESS DEVELOPMENT FOR REMOVAL AND RECOVERY OF PENTACHLOROPHENOL ONTO LOW COST MICRO POROUS CARBON SURFACE: KINETICS AND ISOTHERMS

SUBHA R. AND C. NAMASIVAYAM¹

Coir pith, a low cost agro industrial solid waste was used to prepare activated carbon with ZnCl_2 and used to evaluate its potential for the removal of pentachlorophenol (PCP) from aqueous solution and wastewater. Zinc chloride activated coir pith carbon (ZnCPC) was prepared by mixing coir pith with ZnCl_2 in the ratio 2:1 and carbonized at 700°C for 1h. ZnCPC was characterized using standard physio-chemical methods, BET surface area, SEM, FTIR and XRD studies. Batch mode adsorption studies were carried out to evaluate the effect of contact time, initial phenol concentration, adsorbent dose, pH and temperature. The Langmuir adsorption capacity Q_0 was found to be 189 mg g^{-1} . Quantitative removal was obtained at 250 mg/50 ml of the adsorbent dose for 120 mg L^{-1} PCP concentration. Kinetic studies showed that the adsorption obeyed second order and Bangham's model. Equilibrium adsorption data fit better into Langmuir and Freundlich isotherms. pH effect and desorption studies showed that ion exchange mechanism was involved in the adsorption process. Effect of temperature was not significant. Quantitative removal of PCP from synthetic wastewater was also achieved.

ZnCPC is economically effective compared to commercial activated carbon, since the raw material is abundantly available. As ZnCPC has higher surface area and greater affinity for the phenol to adsorb, it can be used effectively in the treatment of water contaminated with pentachlorophenol.

Keywords: Activated carbon, Coir pith, Pentachlorophenol, Isotherms, Kinetics

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**BIOSURFACTANT MEDIATED DEGRADATION PATHWAY FOR ENDOSULFAN METABOLISM BY *NOCARDIA MEDITERRANEI***

SUKIRTHA. T.H¹ AND NAGARAJAN. S. M²

Endosulfan is a primary cyclodiene insecticide used worldwide in large quantities to increase the yield of vegetative crops. It is a highly toxic substance capable of causing acute and chronic toxicity, which include reproductive mutagenic and carcinogenic effects. The degradation of endosulfan in soil has gained more importance due to the recent outbreak in Kasargod district in Kerala. The biodegradation of endosulfan was carried out with bacteria, fungi and algae effectively.

Since no work has been carried out with actinomycetes and pigment producing microbes, moreover the bacteria effective in degrading pesticide are also been pathogenic to human health, this work with *Nocardia mediterranei* (non pathogenic) which is a novel approach. The biodegradation of alpha and beta isomers of endosulfan in flask coated condition was studied by an isolated *Nocardia mediterranei* from the soil in the laboratory condition. The biodegradation process was carried out by the enrichment technique. The degradation rate by *Nocardia mediterranei* enhanced the rate of biodegradation to 20-30 %. Additionally biosurfactant production by *Nocardia mediterranei* enhanced the rate of biodegradation of endosulfan to 40-45 %. The produced biosurfactant was found to be specific to endosulfan.

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TOXICITY DISTRIBUTION IN SOIL AND GROUND WATER- CASE STUDY

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Disposal of industrial waste on to land into water bodies or into the subsurface geological strata leads to pollution of soil and water sources. Industrial waste of toxicity level of 25 was buried into land. From the geological investigations it is learnt that the soil at the dump site is a weathered rock and highly permeable. The depth of the illegal dump pits and soil formation assessed by electrical test method. Systematic samplings of waste and water samples were done and the samples were analyzed for characterization. Toxicity factor through Bio assay test established. The preliminary surveys indicated ground water pollution due to unscientific disposal of industrial waste. The crop cultivation in this area affected due pollution of ground water source.

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DEGRADATION OF BIFENTHRIN BY BACTERIAL CULTURES ISOLATED FROM ENRICHED SOILS

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Bifenthrin (2 – methyl [1,1-biphenyl] –3– yl) – methyl –3-(2-chloro-3,3,3-trifluoro-1-propenyl) 2,2-dimethyl cyclopropanecarboxylate) is a relatively new insecticide introduced in India. This insecticide is now used in India to control malaria vector, *Anopheles culicifacies* Giles and has replaced traditional insecticides like HCH and DDT. Besides being used for malaria bifenthrin gives good control of termites and fire ants, as well as for control of various insect pests on fruits and vegetables. Bifenthrin persists in soil for a long period of time and its half life in certain cases can be more than 3 years. In the present study an attempt has been made to isolate cultures capable of degrading bifenthrin. The experiment was conducted with sandy loam soil with various amendments like leaf litter, vermicompost, FYM (Farm Yard Manure) and mushroom waste. Repeated bifenthrin treatment was given to the soils at 3 concentrations: i.e. at 0.1 mL/L, 0.5 mL/L and 2.5 mL/L. The bacterial population in soil was estimated one week after the last application and the two dominant cultures (same for all soils) were isolated, purified and tentatively named as Bacteria I and Bacteria II. The ability of Bacteria I and Bacteria II to degrade bifenthrin was studied in a mineral salts medium containing bifenthrin at 1 and 5 $\mu\text{g/ml}$ over a period of 60 days. Between the two, culture II was more efficient in degrading bifenthrin than culture I. In bacteria uninoculated medium 11.2-18.6% bifenthrin degraded compared 26.14-32.2% in medium inoculated with culture I and 87.37-88.14% in medium inoculated with culture II after 60 days. The half-life of degradation of bifenthrin in uninoculated medium was 232.2-237 days compared to 118.6-146 days in medium inoculated with culture I and 29-31.3 days in inoculated medium. The results show that bacterial cultures isolated from bifenthrin treated soil can degrade the same though more work needs to be done on this aspect.

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GOOD LABORATORY PRACTICES (GLP)

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Good Laboratory Practice (GLP) is a system, which has been evolved by Organization for Economic Co-operation and Development (OECD) used for achieving the healthy and non-hazardous goals. GLP applies to non-clinical studies conducted for the assessment of the safety of chemicals to man, animals and the environment. Good Laboratory Practice embodies a set of principles that provides a framework within which laboratory studies are planned, performed, monitored, recorded, reported and archived. Good Laboratory Practices are explained in 8 different parts. Documentation of all tests and test system is emphasized. Standard test methods and procedures are documented and made access to the analysts. Study Director play's a key role and has overall responsibility for the technical conduct of the study as well as for the interpretation, analysis, documentation and reporting of results. It is easy to implement if laboratory is having ISO-9001 and ISO-17025 Certifications and Laboratory Information Management Systems (LIMS) in place.

Keywords: Drugs, human health, test article, test system

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DETECTION OF WOLBACHIA ENDOSYMBIONTS IN SOME INDIAN MOSQUITOES (DIPTERA: CULICIDAE) OF MEDICAL IMPORTANCE

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Wolbachia are maternally inherited intracellular bacteria associated with various reproductive abnormalities infecting wide range of arthropods (16–76%) and nematodes. In mosquitoes *Wolbachia* mainly induce cytoplasmic incompatibility and use this pattern of sterility to spread themselves through populations. For this reason, it has been proposed as a tool to use for gene drive system in mosquitoes, as well as for the reduction of population size and modulating population age structure in order to reduce disease transmission. In the present study, we carried out an extensive polymerase chain reaction survey to detect *Wolbachia* in some species of mosquito belonging to three genera (*Aedes*, *Culex* and *Anopheles*) involved in the transmission of pathogens based on specific amplification of the *wsp-A* and *wsp-B* super group. The results revealed that one species of *Aedes*, three species of *Culex* were found infected with *Wolbachia* barring any infection in *Anopheles* mosquitoes. Among them, 25% harbours double *Wolbachia* infection, while 75% harbour single *Wolbachia* infection. These results indicate the widespread of both double and single *Wolbachia* infection in mosquitoes and provide a wealth of information to exploit this endosymbiotic bacterium in devising a strategic tool for the control of disease transmitting vectors.

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HEALTH RISK ASSESSMENT OF AIRBORNE FUNGI AND BACTERIA IN HOME ENVIRONMENTS OF BANGALORE, INDIA

ARUN JYOTHI MATHIAS¹ AND MANJUNATH K²

Data linking environmental exposure to health effects is lacking. Therefore, to address this issue, microbiological air sampling was performed in seven selected houses and an outdoor busy junction (control) of Bangalore using centrifugal air sampler. The concentration of bacteria and fungi recorded were 5.246×10^2 CFU/m³(mean), range 1.68×10^2 CFU/m³ to 1.078×10^3 CFU/m³ and 3.66×10^2 CFU/m³(mean), range $1.625 - 7.50 \times 10^2$ CFU/m³ respectively. Using a questionnaire an evaluation of the prevalence of respiratory symptoms among 93 respondents staying in independent houses, cluster houses and flats was done to elucidate relationship between bioaerosols and house - related factors. The most common complaint was cough with phlegm in 57 respondents (61.3%) followed by cold reported by 48 (51.6%), headache by 30(32.3%) and wheezing by 10 (10.8%). Dampness in the house, visible water leakage, presence of pets, mouldy odours, ventilation, age of the house, anthropological reasons were the factors which contributed to microbial load. Concentrations of total culturable bacteria correlated significantly with the symptoms ($r=0.53$). Coagulase negative Staphylococci (CoNS) was the most dominant bacterial group and contributed to approximately 30 ~ 35% of the total bacterial concentration followed by Endospore forming Bacilli. *Staphylococcus aureus*, *S.capitis*, *S.warneri*, *M.varians*, *Bacillus lentus*, *B.pumilus* and *Corynebacterium spp.* were the dominant bacteria while *Aspergillus niger*, *A.fumigatus*, *Monilia sitophila* were the predominant fungi identified. Although the inhabitants are exposed to relatively low concentrations of airborne microorganisms which do not exceed the suggested exposure limits, the presence of airborne bacteria and fungi in the dwellings can decrease the comfort of residents' lives by evoking respiratory health problems such as asthma and other allergic and immunotoxic diseases.

Keywords: Airborne fungi, Bacteria, Health complaints, Home environments

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A PRELIMINARY STUDY ON EFFICACY OF MICROINJECTION AND WOLBACHIA IN INDIAN MOSQUITOES

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Wolbachia are maternally transmitted obligate, intracellular symbionts inducing an array of reproductive anomalies in around 76% of the arthropod hosts. *Wolbachia* transfection studies reveal its interactions in novel hosts and also assists applied strategies that use these interactions to curtail pest and vector menace. *Wolbachia* transfection is an important technique which provides unique opportunities to introduce *Wolbachia* in uninfected hosts and understand their functional characteristics and the biology of the organism. Transfection studies in mosquitoes have been recently developed but vary to a great extent to accommodate the unique physical and developmental characteristics of the target insect. With two of the major mosquito vectors (*Aedes aegypti* and *Anopheles Spp.*) not being naturally infected with *Wolbachia*, it provides an ideal platform for transfection studies in mosquitoes. Transfection is brought about by Microinjection where the developing embryos and adults are injected with a glass needle using micro manipulators. Several factors determine the efficiency of transfection and we here investigate diverse techniques of microinjection and at various developmental stages. The results provide us with the knowledge to improvise and adopt few modifications that would enhance the survival, infection status of the novel hosts. It was found that the mortality rate of embryonic injections is more as compared to adult microinjections. However, transfection rates need to be studied in as embryonic injections have a relative advantage over adult microinjections. Embryonic microinjections carried out after bleaching is relatively less efficient as the mortality increases.

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IMPACT OF CLIMATE CHANGE ON DIARRHEAL DISEASES WITH EMPHASIS ON CHOLERA –INTROSPECTION & MITIGATION PATHWAYS

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The implications of climate change on human health in the global context is widely feared to pose substantial risk. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) highlights diarrheal diseases as one of the important health related impacts linked to changes in the climate and the associated changes in the frequency and intensity of occurrence of extreme climate events such as droughts, floods and cyclones. Diarrhea claims about 4,50,000 lives annually in India, much more than in any other country. Even Cholera epidemics are influenced significantly by climate and several environmental drivers have been proposed to explain the seasonal cycle of cholera. Out break pattern of cholera varies with season, mainly with heavy rainfall leading to water logging and lack of potable water; the socio economic, environmental and the climatic factors being all intermingled. Need of a longitudinal study has been urgently felt to evaluate the impact of climate change on cholera where the study area should be chosen widely addressing all climatic zones and data should be collected at a micro level investigation also. In addition to that, it is emphasized that attempts to address, test and identify a range of climatic and non-climatic indicators as potential co-variables in predictive models of diarrheal diseases should be undertaken to assess preparedness of a country or region in dealing with possible negative impacts of climate change on diarrheal diseases to prevent its influence on health. Surveillance types and its duration need to be carefully thought of, wherein case definitions of diarrhea and/or cholera has been underlined. Appropriate choice of study site and populations are essential prerequisites. To assess changes in diarrheal incidence with changes in climate, it is imperative to collect data at similar intervals. Laboratory procedures for laboratory data, measurement and collection of climatic and non-climatic variables, optional climatic data, measurement of outbreak data, data analysis and archiving has been discussed. Prevention in terms of arriving at outcomes, identification of potential indicators, development of disease management and assessment of preparedness and response capacity has been highlighted.

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ENVIRONMENTAL POLICIES AND AWARENESS - A PERSPECTIVE

SHEELA REDDY. C¹ AND N. AMARESWARAN²

Environmental Pollution and the resulting global warming is one of the most challenging problem posing a threat to the very survival of mankind. Despite global and national policies and efforts of governmental and non-governmental organizations striving to mitigate or overcome the problem, pollution free environment is an unrealized dream. Environmental Education has a prominent and promising role to bring awareness about environmental policies to tackle the problem. It is a process of recognizing values and clarifying concepts in order to develop skills and added tools necessary to understand and appreciate the inter-relationship among man, his culture and his bio-physical surrounding. It creates an overall perspective, which acknowledges the fact that natural environment and man-made environment are interdependent. It should consider the environment in its totality. Environmental Education should be a continuous lifelong process beginning at the pre-school level and continuing through all stages. It is not only a chief but a cheap tool to foster policies towards fruitful and healthy environment. It is apt to remember John McConnell (founder of International Earth Day) words. "Let every individual and institution now think and act as a responsible trustee of Earth, seeking choices in ecology, economics and ethics that will provide a sustainable future, eliminate pollution, poverty and violence, awaken the wonder of life and foster peaceful progress in the human adventure." It is the moral responsibility of every human being to bequeath a safer heaven to future generations. All nations need to shoulder responsibility on an equal footing to protect the planet earth as it is a global concern. The poor nations alone cannot bear the brunt of the profligacy of the rich nations. The present paper is an attempt to think over uniform global environmental policies and to analyze the way awareness can be brought about to strive for pollution free environment through environmental education.

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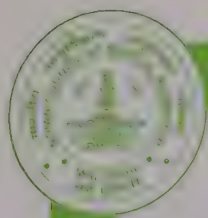


MALARIAL DIAGNOSIS USING HAND HELD MICRO-PCR

MANJULA.J., KISHORE KRISHNA KUMAR, S.M. SHASHIREKHA, AVINASH KUDVA, CHANDRASEKHAR B. NAIR, P.V. SUBBA RAO

Malaria remains a serious problem with a global annual death toll of 0.7-2.7 million. Accurate and rapid diagnosis is essential for proper malarial treatment. Microscopic examination of blood smear is the "gold standard" for malarial diagnosis. The method is sensitive and specific but laborious and time consuming. Serological diagnostic methods and rapid diagnostic tests (RDT) include Parasight-F (Becton Dickinson), ICT Malaria Pf/Pv (ICT Diagnostic), and OptiMAL (Flow Inc.). The RDT methods do not offer improved sensitivity over microscopy, the sensitivity decreases as parasites fall below 100 per μl . To overcome these limitations bigtec has developed a portable handheld, rapid microPCR device based on real time detection to achieve the sensitivity and specificity of the 'gold standard', while retaining the rapid result advantage. The device consists of a portable unit housing sample holder, optical detection system, electronics controlling different aspects of the unit, PDA and a disposable chip. Specific primers and probes have been developed for detection of both *Plasmodium falciparum* and *Plasmodium vivax*. The reaction progress can be monitored real-time. A comparative study on bigtec's microPCR and the commercial ABI 7500 machine running clinical samples showed identical results. All the positive samples were picked at comparable Ct values, while the negatives were not picked. The lowest parasitic load that could be detected was 30 per μl . The time taken from sample to result using bigtec's micro PCR was 30 mins.

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GENOTOXIC POTENTIAL OF PANMASALA EMPLOYING MICRONUCLEI ASSAY IN SWISS ALBINO MICE

MOJIDRA BN, GAUTAM AK, ARCHANA K, VERMA Y, LAKKAD BC, SUNIL KUMAR

Habit of chewing panmasala is increasing, very popular among young generation and it is more prevalent in Indian subcontinent. Panmasala plain (PMP) is a dry powder mixture of areca nut, catechu, lime, cardamom, unspecified flavouring agents etc. Gutkha is another popular variety of panmasala containing tobacco (PMT). These alternative tobacco products are often advertised as being safer than smoking. Keeping in view of addictive nature of areca nut and tobacco, the present investigation was planned to study genotoxic potential of panmasala using micronucleus assay in Swiss albino mice. Animals were orally fed with three doses (0.5, 1.5 and 3%) of each PMP and PMT for 6, 12 and 18 months. Respective control groups were maintained on standard mice feed. Marrow was aspirated from Femur bone in Fetal Calf Serum and processed for micronucleus assay. Slides were observed microscopically for the presence of micronuclei. Polychromatic erythrocyte (PCE) and Normochromatic erythrocyte (NCE). Ratio of PCE and NCE was also calculated to measure cytotoxicity. Significant increase in the percentage of micronucleus was observed in the PCE at all the three doses (0.5, 1.5 and 3%) of both types of panmasala treated groups in all the three durations as compared to corresponding controls. The percentage of micronucleus in the NCE was also increased in all the panmasala treated groups for 6, 12 and 18 months which was significant at high doses (3%) of both PMP and PMT treated groups for 6 and 12 months. A non-significant decline was observed in the ratio of PCE to NCE at all the panmasala dose levels. Results indicated genotoxic potential of panmasala. There is a need to educate young generation about the adverse effects of panmasala.

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EFFECT OF PRENATAL AND POSTNATAL EXPOSURE OF FLUORIDE ON CERTAIN ENZYMES IN DEVELOPING CNS OF RATS AND AMELIORATIVE ROLE OF SELECTED ANTIOXIDANTS.

MADHUSUDHAN. N, SHABANA BEGUM, P.MAHABOOB BASHA¹

Ingestion of excess fluoride, most commonly in drinking-water, can cause fluorosis, a serious public health problem in several parts of the world. Knockout evidences indicate that oxidative stress is one of the decisive pathologic mediating factors in fluoride toxicity. But its occurrence in developing CNS during maternal exposure and its intervention are not elucidated in detail. Hence, the study is aimed to assess the dyshomeostasis caused on certain vital enzymes and the ameliorative role of supplemented antioxidants. In the present experiment pregnant Wistar albino rats were exposed to 50 and 150 ppm fluoride in drinking water. On post partum, the pups born to them were supplemented daily per kg body weight with vitamin-C (20 mg), vitamin-E (400 ìg), selenium (40 ìg) and zinc (200 ìg). On 21st postnatal day the pups were sacrificed and discrete regions of CNS viz. cerebral cortex, cerebellum, medulla oblongata and spinal cord were isolated and assessed. In comparison to control, significant ($P<0.05$) increase on the levels of fluoride, lipid peroxidation(LPO), protein carbonyls(PC), Acetylcholine esterase (AChE) and decrease in catalase, superoxide dismutase, protein thiols and Na⁺/K⁺-ATPase activities were observed in dose dependent manner with no regional specificity. In antioxidant supplemented animals the perturbations caused were less. The findings suggest that fluoride may contribute to neurological dysfunctions leading to pathogenesis. The antioxidant supplementation duly rectified the disquiet caused by high fluoride exposure during extreme vulnerable period of life.

Keywords: AChE, Antioxidants, ATPase, Fluoride toxicity, Lipid peroxidation, Oxidative stress.

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AGE ASSOCIATED OXIDATIVE CHANGES IN RAT BRAIN REGIONS ON EXPOSURE TO HIGH FLUORIDE: ROLE OF GRAPE SEED AND GREEN TEA EXTRACTS

FIYAZ AHMED, N. MADHUSUDHAN, SHABANA BEGUM, P. MAHABOOB BASHA¹

Fluoride becomes toxic at higher doses and induces some adverse effects on various organs including brain. The generation of reactive oxygen species and oxidative stress has been implicated in the mechanism of brain dysfunction due to age related neurodegenerative changes. The exact mechanism(s) underlying in the neurotoxicity caused by excess fluoride still remains unexplored. The present study evaluates the age related oxidative macromolecular changes in rat brain regions and to assess the efficacy of grape seed and green tea extracts against fluoride toxicity. Young (2-3 months aged) and old (18-24 months) Wistar albino rats were exposed to 200 ppm F⁻ through water for a month. After toxicity exposure the animals were subdivided and orally supplemented with grape seed (100mg/kg bw) and green tea extract (100mg/kg bw) for 10 consecutive days. On 41st day animals were sacrificed and discrete regions of brain were isolated and used for assessment. An age associated increase in LPO, protein oxidation, and decrease in SOD, Catalase, GPx, GST, and GSH were observed significantly in the discrete regions of brain during F⁻ exposure which was reversed by grape seed and green tea extracts nearly normal levels. These findings suggest that administration of grape seed and green tea extracts inhibit free radicals induced oxidative macromolecular damage in aged rats and thereby protects the nervous tissue from ROS.

Keywords: Antioxidants, Fluoride toxicity, Grape seed extract, Green tea extract, Oxidative stress.

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AGE RELATED INTERACTIVE EFFECTS OF CHLORPYRIFOS TOXICITY AND COLD STRESS ON DEVELOPING CNS OF RATS: STUDIES ON ATPASES, ACHE AND OXIDATIVE STRESS MARKERS

ANNAPPA POOJARY, P.MAHABOOB BASHA* AND SHABANA BEGUM.

Though the use of pesticide brought about revolutionary changes in agriculture, the debates of pesticides have given rise to many serious health and environmental problems. Chlorpyrifos (CPF), is a both chlorinated and organophosphorous (OP) chemical with toxicity characteristic of each class of compound. Like many other OP compounds, its toxicity centers on irreversible inhibition of AChE in nervous and peripheral tissues. The toxicity of OP compounds may be antagonized or potentiated when they are exposed to low temperatures. Since no information is available on interactive effects of CPF and cold stress, the present study is proposed. Sublethal doses of CPF were administered to neonatal (LD_{50} -45 mg/ kg bw), juvenile (LD_{50} -45 mg/ kg bw) and adult (LD_{50} -279 mg/ kg bw) Wistar albino rats to assess the neurotoxic potential of insecticide. Further, they were exposed to 15 and 20 °C temperatures. The discrete regions of CNS like cerebral cortex, cerebellum, medulla oblongata and spinal cord were used to assess regional impact. The results showed that the CPF exposure and cold stress in rats caused significant inhibition of AChE, marked increase in lipid peroxidation and alterations in the other oxidative stress markers in discrete regions of CNS. The activity levels of ATPase viz., Na^+ - K^+ , Ca^{2+} and Mg^{2+} ATPase showed different behaviours on CPF exposures and cold stress to rats. Toxicodynamic factors, age and regional specific detoxifying mechanisms are the potential candidates involving in the assessment of neurotoxicity of CPF and cold stress.

Keywords: AChE, ATPase, Chlorpyrifos, Lipid peroxidation

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A KAP STUDY REGARDING HIV/AIDS AMONG GARMENT FACTORY WORKERS

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HIV/AIDS has become a major problem in India and Karnataka is one of the top six states having highest prevalence. Garment industry is one of the fastest growing industries attracting adolescents and young adults. Since many risk behaviors, associated with the transmission of HIV, are adopted in young ages, it is very important to put much of the prevention efforts on these vulnerable age group. Hence this study was proposed. The objectives were to evaluate the knowledge, attitude and practices regarding HIV/AIDS and to assess the high risk behaviors. Study design – Cross sectional, Study Period –October 2007. Study Population – 6 randomly selected garment factories in Bangalore. A total of 216 unmarried workers were interviewed regarding knowledge of HIV/AIDS, their attitude towards the disease and also questioned about their private life. At the end of interview health education was given individually. Out of 216 study population 70.4% females. 78.7% were aware of sexual transmission of HIV and 74.7% knew that HIV spreads through contaminated blood and sharps. Still there are misconceptions like spread of AIDS through mosquito bites (32.9%) and sharing personal things (15.3%). Out of 216, 7 men and 5 women said that they had sexual experience and during which they had not used condoms consistently. There is an incomplete knowledge about causation and prevention of HIV/AIDS. This study revealed a high risk behavior among some of the workers, which make them more vulnerable to HIV/AIDS and other STD's. The need of the hour is a continuous Health Education and counseling regarding HIV/AIDS.

THE STUDY OF BIODIVERSITY & WILDLIFE REFUGE OF MYANKALEH INTERNATIONAL WETLAND

HASANZADEH HOSSEINABADI HASAN¹ and AHMADI OMOLBANIN²

The Myankaleh Wildlife Refuge is involve quartet areas management the Environment Conservation Organization that has dedicated to conserving and reviving plants and animals societies, which is the remains of the Khazar plain forest. This refuge includes two remarkable ecosystems of Myankaleh lagoon and a peninsula considered to be an important habitat of migrated fowl and waterfowls. In the past this region was a habitat for several mammals like *Panthera tigris*, *Cervus elaphus*, *Panthera pardus*, *Canis lupus* and *Acinonyx jubatus* while now it is known as a winter resort for several bird species besides some nearly extinct species such as, *Oxyura leucocephala*, *Greater Flamingo*, *Whoep swan*, *Phasianus colchicus*, *Francolinus francolinus*, *Persian pheasant*, black and mammals such as *Vulpes cana*, *Oryctolagus cuniculus*, *Sus scrofa* and *Felis catus* are known as native species of This area with regard to refuges untapped the area and being recherché varieties and putting in danger of plant and animal and with the aim of preserving from the kinds as genetic supplies and protecting biological diversity has been conserved. The Myankaleh Wildlife Refuge its ecological richness and importance as a habitat for numerous endangered species recognized as an international biosphere resource. This refuge identification in order to determine the present condition of this area and that values and capabilities has been considered in behalf of environment protector and environmentalists.

Keywords: Environment, Biospher, Biodiversity & Myankaleh

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STUDY ON DOMESTIC SOLID WASTE WATER AND WATER QUALITY OF SARI CITY MAZANDARAN

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The present study is aimed to calculate domestic solid wastewater in Sari city, Mazandaran. Solid waste management mainly involves management of activities that are engineering oriented such as waste generation, storage, collection, transportation, operation of processing and disposal facilities. A small composting unit is suggested for the composting of solid waste at community or colony level so that the community committee itself can maintain the composting unit. The study is to analyze the solid waste disposal system and suggest suitable modifications in the present system to improve the solid waste management system in the city, assess the present solid waste management practice in city and find out the gap and deficiencies and suggest the remedial measure in the form of solid waste management plan to have safe clean environment in the city of Sari. If not managed properly the waste can have an adverse impact on the environment and public health arising from contamination of soil, water and pollution of air and through spread of diseases via vector living on waste.

Keywords: Environment, Waste water, Water quality and Domestic.

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EVALUATING EFFECTS OF OBTAINING ORGANIC FERTILIZER FROM ANIMAL AND BIRD WASTES ON ENVIRONMENT

HOSSEIN ISMAEILI GHOLZOM

Today, it has approved that using chemical fertilizer is caused elimination of soil and its fertility in long term period so that using organic fertilizers that are obtained from the nature is prevailed again in most developed countries, unfortunately, it is not paid attention efficiently in many country. In Iran despite of rich resources of organic materials and these valuable resources are wastes without application. Experience and knowledge have approved that approximately 90% of all organic materials of human environment are recycled and entered correctly into Natural cycle. This method is actually use and change of organic materials existing in the nature by using different microorganisms in the exposure of moisture and heat in aerial conditions. This research is in context of evaluating environmental effects of building SHOMAL – KOOD-KAZER animal compost company and its main purpose obtaining organic fertilizer from animal and bird wastes in khorasan shomali province. In this research, we try to evaluate two options of execution and no execution of this plan by Leopold matrix after collecting the information and possible effects of this plan on region environment are reviewed after completing inventory tables and finally, option of executing plan by observation of all anticipated environmental considerations and measures in building shomal – cood- khazar animal compost company is concluded.

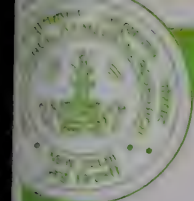
Keywords: Environmental, Chemical fertilizers, Organic fertilizer, Animal compost, Environment, Leopold matrix

POLYMERIC CHELATING LIGANDS FOR TOXIC METALS REMOVAL FROM VARIOUS WATERS

LUTFOR RAHMAN, SIMON SIEW YONG WEN, SAZMAL EFFENDI BIN ARSHAD

Environmental pollution globally by toxic metals through industries, agricultural processes and waste disposal is a major concern worldwide. A large environmental, public health and economic impact are persistent due to the toxic metals transported into environment. The present work deals with removal of toxic metals from the industrial wastewater and various river water using column technique. Indeed, polymeric chelating ligands containing hydroxamic acid and amidoxime ligands were introduced for toxic metals removal. Batch absorption was carried out to find the binding property of metal ions. Maximum sorption capacity of copper for the amidoxime ligands is 2.80 mmol/g and the rate of exchange of some metals was faster i.e. $t_{1/2} < 10$ min (average). Three types of wastewaters those containing chromium, nickel, copper, iron, lead, cadmium etc. used in this study. It was found that the metals recovery was highly efficient more than 99% of metals were removed from wastewater and as well as other water sources. Therefore, polymeric chelating ligands could be used to the removal of toxic metals from the various waters and these ligands can be used as effective methods for environmental protection.

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IMPLEMENTATION OF MM5 MODEL FOR EVALUATION OF NORTHERLY SURFACE FLOWS OVER COMPLEX TERRAIN IN SOUTH EASTERN OF IRAN IN THE HOT SEASON OF THE YEAR

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A. A. BIDOKHTI⁴, A. RANJBAR⁵

The Lut Desert of Iran Which is an elongated valley oriented north-northwest to south-southeast descends southward to the Jaz Murian dry lake through a pass. The LLJ in the Lut Desert valley and the Jaz Murian dry lake is worthy of study because it may cause hazardous operating conditions in the region in terms of turbulence and dust mobilization. The strong winds can mobilize dust in the inland deserts and transport it to the Gulf of Oman, severely restricting the visibility in the area. The Lut valley and the dry lake lie along the eastern foothills of the Zagros Mountains. The mountains can block the low-level easterly airflow that is driven by the synoptic north-south pressure gradient and force the airflow to turn to the south along the mountain foothills. In this study a dominating case study for low level jet formations in the hot season of the year is selected, While in the numerical study the regional MM5 model with the nesting of 4 km and 12 km and Bam station as nest center is applied, while the outputs of Global Forecasting Model (GFS) is considered as input for this model leading to achieve an appropriate dynamical analysis of flows in the region for the hot season of the year.

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EFFECT OF DISCHARGE OF INDUSTRIAL EFFLUENTS ON GROUNDWATER QUALITY AND RELATED HEALTH DISORDERS

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Due to inadequate supply of surface waters, most of the people in India are mainly dependent on groundwater for domestic and irrigation uses. Most parts of India are facing anthropogenic groundwater pollution. One of the reasons for ill health is largely due to lack of safe drinking water and contamination of drinking water sources is one of the biggest threats to the welfare of the mankind. The present study aims to assess the groundwater quality in one of the major industrial areas of Bangalore city, and the impact of industrial effluent disposal on their quality. In this connection, 30 groundwater samples were collected from in and around the industrial area and subjected to a comprehensive physico-chemical analysis. The investigations reveal that a large part of the study area is highly contaminated due to the excessive concentration of one or more water quality parameters such as nitrates, total hardness, calcium, total dissolved solids and iron, which have rendered nearly 57 percent of the water samples tested, non-potable. Severe out-break of gastroenteritis which resulted in more than 200 people being hospitalized in a span of just one week clearly support the correlation between the groundwater contamination in the area and health problems faced by the residents.

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POLYCHLORINATED BIPHENYLS (PCBS) AND POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) IN TISSUES OF PARIAH KITE *MILVUS MIGRANS GOVINDA* IN AHMEDABAD, INDIA

DHANANJAYAN V¹ AND MURALIDHARAN S

Polychlorinated biphenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) are ubiquitous environmental contaminants due to their persistence and lipophilicity. As birds occupy a wide range of trophic levels in different food chains, they are exposed to varying concentrations of these contaminants. An understanding on the exposure of organic contaminants to animals in higher- trophic levels is essential to assess the possible adverse effects. Present study was carried out to, assess the magnitude of PCB and PAH contamination in Pariah Kite *Milvus migrans govinda* in Ahmedabad, and document the variation in residue levels among tissues, years and between sexes. A total of 189 tissues (brain, liver and muscle) belonging to 63 individuals of Pariah Kite which were victims to kite flying in this region between 2005 and 2007 were analyzed. While total PCB concentration in brain, liver and muscle samples were 1517 ± 296 , 1150 ± 159 and 1380 ± 237 ng/g wet wt, PAHs were 398 ± 146 , 231 ± 64 and 130 ± 15 ng/g wet wt respectively. There was no significant variation in PCB and PAH contamination among tissues, except a few cases. There were no differences between sexes and among years as well (ANOVA, $P > 0.05$). In many cases ?PCB and ?PAH levels exceeded the levels associated with potential avian health effects reported elsewhere. If exposure level continues residues may reach levels which can cause decreased reproduction or survival in some years, particularly when combined with other non-anthropogenic stressors such as food scarcity. The study recommends continuous monitoring of PCBs and PAHs in the environment using birds as tools.

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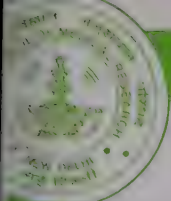
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DETECTION OF *E. COLI* IN DRINKING WATER SAMPLES BY SPECIFIC AMPLIFICATION OF *LAC Z* AND *UID A* GENES.

SARAH SUNITHA, SEEMA THARANNUM, CHANDNI.M, MANJULA.T.S, NITHYA.J, SHYAM SUNDAR.C, VANITHA. J

Coliform bacteria include organisms like *Escherichia coli*, *Enterobacter*, *Klebsiella* and *Citrobacter*. They are gram negative, facultative anaerobic, non-sporulating and lactose fermenting organisms. *E.coli* is used as the indicator organism for detection of fecal contamination of water. Conventional methods for the detection of these Coliforms in water include microbiological culture assays in lactose containing media and also enzyme based assays for the detection of β -galactosidase using chromogenic substrates like *ortho*-nitrophenyl- β -D-galactopyranoside. These methods are cumbersome with limited specificity. DNA based molecular technique like Polymerase chain reaction is recommended since it is highly specific. In this paper, we report the use of PCR for the amplification of the *Lac Z* (β -galactosidase encoding) gene to confirm the presence of Coliform bacteria in drinking water samples which included commercially supplied bottled water and municipal water. The organisms isolated were further used for PCR amplification of *uid A* structural gene which is specific to *E.coli*. The method could be an effective epidemiological tool to pin point the source to contain outbreaks of waterborne disease episodes.

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MULTIGENERATIONAL EVALUATION OF NEUROTOXOCITY INDUCED BY FLUORIDE IN RATS

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Fluorosis is caused by excessive fluoride ingestion over a prolonged period and its interference with normal neurite development through a variety of mechanisms has been indicated. No information is available on the timing pattern, level of fluoride exposure which largely determine parts of brain that will be affected and to what degree various stages of development provide critical windows of vulnerability during which exposure to fluoride may have lasting effects on brain function. The present study address to evaluate multi-generational effects of fluoride induced neuro-toxicity. Albino rats were given high doses of fluoride (200 ppm F) continuously for three generations. By mating the off-springs of first generation, the second generation was obtained and similarly the third generation was obtained by mating the second generation animals while exposing to fluoride throughout the study. Oxidative stress markers viz., super oxide dismutase (SOD), Catalase (CAT), glutathione peroxidase (GPx) and lipid peroxidation (LPO) were measured in 3 generation fluoride exposed rats. Histopathological studies were also made to assess the regional differences. Among antioxidant enzymes studied SOD, CAT, GPx were decreased and LPO was increased with regional alterations in three different generations on exposure to fluoride. The results confirm that fluoride provoked oxidative stress and depleted the antioxidant defense / homeostasis by fluoride accumulation in three generation rats which could contribute to tissue injury via free radical stress and lead to IQ impairments and intelligent defects. Thus chronic fluoride intoxication in the developmental stages of life caused marked neurodegenerative changes in the discrete regions of brain. These changes may form the neural basis for impaired learning, memory, abnormal behaviour patterns and altered physiology.

Keywords: Fluorosis, Free radicals, Multi generation, Oxidative stress

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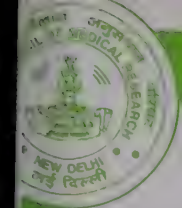
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ASSESSMENT OF HEAVY METAL CONTENTS IN THE AMBIENT AIR IN AND AROUND ERODE

SAKTHIVEL. P¹, C. VIJAYANAND², K. KALAISELVI, M. PALANIVEL

The present study is carried out to estimate the concentration of various heavy metals (Cu, Zn, Pb, Cd, Ni, Cr and Fe) in SPM of ambient air in Erode sampling locations were selected in and around Erode including the industrial and traffic areas to assess the extent of its contribution to the atmospheric metal content. Like any other city, in India, Erode is also not planned where the boundary for various human activities such as commercial, residential and industrial zones are not clear. The average concentration of SPM at all sampling stations showed wide variation. The order of average concentration of heavy metals in SPM of Erode ambient air is $Zn > Fe > Cu > Pb > Cr > Ni > Cd$. Among the heavy metals Zn registered higher concentration in all sampling stations, While Cd was below detectable level ($<0.001 \mu g/m^3$). There is no significant correlation between the concentration of SPM and any of the reported metal concentrations which indicates the heterogeneous nature of SPM in the ambient air. Apart from vehicular sources, emissions from industries in particular, have been identified as possible sources of heavy metals present in the ambient air of Erode. Engineering works, metallurgical industries situated in and around Erode are releasing appreciable quantity of particulate pollutants, possibly of metal oxides along with SPM. CPCB has prescribed standards for SPM, SO_2 , NO_x and PM_{10} but not for other substances. Also our standards are not talking about number, size chemical composition of SPM in air. Chemical composition of the particles is equally important to assess the prevailing air quality of the place. Findings of the present study highlighted the lacuna in the ambient air quality standards practiced in our country. These facts need more attention to tackle pollution problems. In addition, the corporate & industrial sectors must adopt cleaner production mechanisms and stringent air quality standards.

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MONITORING OF XENOBIOTICS IN THE MARINE ENVIRONMENT WITH SPECIAL REFERENCE TO DDT RESIDUES IN MARINE FISHES

JAYANTHI. P AND S. MURALIDHARAN

Extraordinary rapid industrial development and growing demand for food as a result of increasing human population has lead to a substantial increase in the production of agro-chemicals like pesticides and fertilizers, resulting in continued contamination of our aquatic environment. The use of pesticides for agriculture, forestry and health purposes is now so extensive that it has affected almost all forms of living organisms. In many places the soil, plants, animals and waters are found to contain pesticide residues (Allen *et al.*, 1976). Many of the potential effects of pesticides on humans and aquatic ecosystems remain undocumented. Extensive use of DDT for public health purposes has resulted in serious health hazards to the nontarget aquatic organisms mainly fishes. In this regard the marine fishes are found to be the best indicators for the DDT contamination in the marine environment. Hence the present study was carried out to determine the DDT residue levels in seven species of fishes caught at Cochin and Rameshwaram and sold in Coimbatore market. Since all these species included in the study are consumed by the local population, data generated through this study help to evaluate the input of contaminants to human beings. A total of 715 samples comprising six species of fishes, namely *Carangoides malabaricus*, *Cynoglossus macrolepidotus*, *Nemipterus japonicus*, *Rastrelliger kanagurta*, *Sardinella longiceps*, *Scomberomonus commersonn* and *Sphyrna barracuda* were collected from the Coimbatore fish Market. All the fish samples were analyzed for the residues of DDT and its metabolites namely *p,p'*-DDE, *p,p'*-DDD and *p,p'*-DDT. The result clearly indicates the presence of DDT and its metabolites in the marine environment. Residue levels among the species and the study areas and the seasons are not statistically significant. There was no significant correlation between the body size and DDT residues. Highest residue was recorded in *Rastrelliger kanagurta* followed by *Sardinella longiceps* which exceed the MRL levels prescribed for fishes by various statutory agencies. Hence, continuous monitoring is recommended to assess the input of DDT residues in to the marine environment and other ecological component.

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ELEVATED BMI AND WAIST TO HIP CIRCUMFERENCE INDICATE OBESITY IN A COHORT OF BANK EMPLOYEES OF TAMILNADU, SOUTH INDIA

SHAJITHANOOP.S¹, S.M.RATHINAVEL² AND M.V USHA RANI¹

Obesity - the 'New World Syndrome' is on a continuous rise in all age groups of many developing nations. Change of occupations, advent of newer technologies and rapid pace of life has resulted in more sedentary work and less energy expenditure. Obesity is a natural consequence of over nutrition and sedentary lifestyle. A total of 126 bank employees (Males n = 63, Female n = 63, Mean age = 37 years) were recruited in this study. Dietary habits, life style pattern and exercise regimen was recorded using a validated questionnaire. Body mass index (BMI) and Waist and hip circumference was recorded in fasting state. The influence of vital factors on weight gain was determined using Pearson's coefficient test. The mean BMI among male subjects was 31.25 kg/m² and in female subjects was 29.09 kg/m². Mean waist circumference (Male: 93 cm, Female: 88 cm) in the subjects are indicative of obesity. Progressive weight gain with increase in age was evidenced among men (43%). Dietary intake of trans fatty acids and saturated fats in the subjects was high as evidenced by habitual intake of snacks at work.

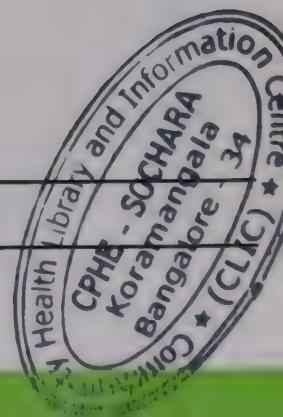
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RESPONSIBLE MINING, ENVIRONMENTAL PROTECTION AND HUMAN HEALTH: A CASE STUDY OF SUKINDA CHROMITE MINE

ASHUTOSH DAS

Sukinda Chromite Mine located in Sukinda valley is the largest open cast chromite mine in India. There has been a substantial number of studies suggesting the deteriorating environmental quality due to the operation of chromite mining in Sukinda valley (Dhakate and Singh, 2008; Dubey et. al, 2001). In a recent study (Blacksmith Institute, 2007) Sukinda has been reported as one of the ten most polluted places of the earth. As per the report, hexavalent chromium coming from the chromite mines of the area has been responsible for its environmental degradation resulting in a series of morbidity conditions. However, a close look at the available data clearly indicates towards an exaggeration made in the report. In fact, the Orissa State Pollution Control Board (OSPCB) has already dismissed the report. Nevertheless, there is no doubt that Cr VI is a carcinogenic element which is largely found in the environment of Sukinda. Therefore, there is an unambiguous need for taking serious steps to safeguard the environment so as to attain the highest possible quality of life. In the words of Singh (2009), mining industry has been trying to contribute in a responsible way while adopting environmental friendly practices besides meeting the challenge of societal development. In this regard, Tata Steel has implemented a variety of mitigative measures to improve the working environment. Besides, the industry has always tried to increase environmental awareness of the local public. Tata is the only private organization working in the valley having a hospital and is the first of its kind to obtain OHSAS 18001:2007, SA 8000, ISO 14000 and ISO-9001 certification. As far as the health status of the residents is concerned, OPD attendance (in terms of no. of patients) has been significantly declined in the recent years and there has not been much change in indoor occupancy (in terms of bed days) too. However, the increasing mining activities, if not managed properly would make the Blacksmith report a reality in near future.

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**LIFESTYLE IMPACT ON BPO PERSONNEL LEADING TO OSTEOPOROSIS**

GEETA MOHAN

Osteoporosis is a bone disease characterized by low bone mass and micro architectural deterioration of bone tissue leading to bone fragility and increased fracture risk. Risk factors for Osteoporosis can be split into non-modifiable and modifiable risks. Non-modifiable risk includes advanced age in both sexes, in females estrogen deficiency following menopause, in males decrease in testosterone levels. Modifiable risks are malnutrition (low dietary intake of calcium), chronic heavy drinking especially at a young age, tobacco smoking, and stress to mention a few. Some of the life style changes in BPO employees are sleep disorders, eating disorders, depression and stress. A survey was conducted on 120 BPO employees in the age group of 20-30 years by requesting them to fill questionnaires regarding their lifestyle habits, dietary intake and awareness of Osteoporosis. Only 18% of the sample size were aware of the term Osteoporosis, majority of them were exposed to less than 1 hour of direct sunlight per day, their daily dietary intake was below the daily requirement. All these factors clearly indicate that BPO employees are prone to Osteoporosis.

THE EFFECTION OF CONSULTATION AT HOME ON MENOPAUSAL WOMEN LIFE STYLE

FATEMEH MOGHADDAM TABRIZI

This is experimental study by aim of assessing effect of counseling on life style in menopausal women in Urmia (IRAN). 120 menopausal women by age 60-45 that 1 years had passed from their last menstruation, were selected. These women didn't have any systemic disease or premature menopause, and had atleast literacy for interviewing. These women were introduced to the researcher by governmental family health services. Informations about life style were gathering via questionnaire by interview. After that samples divided to 10 group by 12 women in each. All groups participated in counseling courses every week for 1/5 hours each session. Then 6 week after last session post counseling test was done. Statistic test that used in study were: pair t test, Mc Nemar and Kendalls W test. Results showed that: there was a significant difference in items such as nutritional habits, physical activity, sunlight exposure, sleep, vacation and use of therapeutic services by women before and after counseling ($P=0/000$). Also in avoiding of smoke exposure there was a significant difference before and after counseling ($p=0/016$). Findings of this study showed that counseling has a significant effect on life style and behavior change to increase women health in menopausal period. Because of increasing of life expectancy in recent years and then increase duration of post menopausal period, counseling of women in this phase to take care of these groups are essential and important for every country.

SLEEP QUALITY AMONG SOFTWARE ENGINEERS: PREVALENCE AND ASSOCIATION WITH QUALITY OF LIFE

SARA SARRAFI ZADEH, KHYRUNNISA BEGUM, KHYRUNNISA BEGUM

Insomnia is a major health challenge since it affects tremendously health and wellbeing of people and their quality of life. Quality of life (QOL) is therefore considered as an outcome measure in sleep disturbed people. Recently insomnia has received increasing attention from health care providers. This study aims to determine prevalence of insomnia among software engineers and its impact on their QOL. Methodology: Ninety one software engineers aged 18-45 were selected from a software developing company in Mysore. They were assessed for quality of sleep using Standard Insomnia Screening questionnaire and the QOL was measured according to SF36. Result: The quality of sleep assessed among the subjects indicated the following: severe insomnia (SI) 21%, mild insomnia (MI) 35% and 44% had normal (N) sleep. The mean scores for QOL were found to be 59.1 for the subjects with SI, 70.24 for those with MI and 70.44 with normal sleep. Scores for the different components of QOL included were Physical Health-subjects with SI had lowest scores (60.45) followed in an increasing order were those with MI (71.07) and Normal (71.81); Mental Health-similar trend appeared with lowest scores for subjects with SI (57.16) followed by those with MI (71.07) and Normal (71.81). Conclusion: Sleep quality affects quality of life considerably, subjects with severe insomnia exhibited poor QOL by virtue of low scores. Small differences in sleep quality brought about marked difference in scores for QOL. Software engineers in general and participants in particular are at risk to develop severe sleep problems. The condition demands attention about sleep hygiene and development of remedial strategies.

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FOOD AND NUTRITION SECURITY THROUGH VEGETABLE PRODUCTION AT CHANGED CLIMATIC SCENARIO

SABINA ISLAM¹, A.D. MUNSHI¹, S. JOSHI¹ AND A.S. SIDHU²

The impact of climate change affect crop production mostly by interfering with temperature sensitivity of individual crop, erratic rainfall pattern affecting water availability and increased CO₂ concentration in the atmosphere. The climate change is bound to increase global average temperature and IPCC projects that there will be increase in temperature between 1.4 and 5.8^o C at the end of this century. To ensure and maintain food, nutrition, financial and socio-psychological security, attempts need to be undertaken to minimize the negative impact of climate change on food production. Horticulture in general and olericulture in particular with its high economic output per unit area and time has emerged as an important alternative to the traditional cereal based cropping system over the years. To mitigate the effect of high temperature, genetic improvement in various vegetable crops have already began and number of varieties have been released having high yield potential at the elevated temperature regime. Pusa Hybrid -1 and Pusa Sadabahar of tomato, Pusa Early Synthetic and Pusa Vrishti of cauliflower, Pusa Chetki of Radish, IPC Ht-2 of carrot, Pusa Harit of palak and majority of hybrids of cabbage are the examples of selected few, which give increased yield at high temperature and already lead to the area expansion in comparatively higher temperature zone especially the peninsular India. Vegetable varieties have also been developed with better water use efficiency. Arka Kalyan of onion, Arka Meghali of tomato and Arka Mohini of capsicum are few such examples. Apart from genetic improvement, efficient and economic water management is the crucial point for successful crop production. Drip irrigation system-which is considered the most economic way of water application to crop, has been found feasible for commercial vegetable production system and it has been reported to boost yield potential by 15-70% in various vegetable crops. Majority of the vegetable crops belong to the C3 group and expected to give increased yield at elevated CO₂ concentration as the high temperature tolerant varieties are expected to have comparatively less photo respiration. Elevated CO₂ (550 ppm) have been reported to enhance yield and quality of tomato, onion, cassava and sweet potato. Considering the above facts, vegetable cultivation can be easily bank upon to ensure food and nutrition security of the nation at the changed climate scenario.

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ASSESSMENT OF HEAVY METAL IN ATMOSPHERIC PARTICULATE MATTER OF T UNDERDEVELOPING CITIES IN INDIA

SOMNATH SEN¹ D.P.MUKHOPADHAY

Although good deal of studies of metal contamination in PM_{10} in metropolitan cities has been carried out in India, little attention has been paid to this kind of study in towns. Therefore investigation was carried out to assess the level of metal contamination (Fe, Cd, Cr, Cu, Pb, Zn) in PM_{10} in different locations of Durgapur in West Bengal and Bhubaneswar in Orissa during winter. The abundance of PM_{10} was ranging from $154 \mu g m^{-3}$ to $350 \mu g m^{-3}$ and $244 \mu g m^{-3}$ to $463 \mu g m^{-3}$ in Bhubaneswar and Durgapur respectively. The concentration of PM_{10} exceeded the permissible limit of $100 \mu g m^{-3}$ (residential zone). The metal content adhered to PM_{10} was in the order of $Fe > Cu > Zn > Ni > Cr > Pb > Cd$, and in Durgapur was $Fe > Zn > Cu > Pb > Ni > Cd$. The Correlation coefficient computed among the RSPM and metals did not exhibit any significant correlation of all the metals with RSPM. However correlation was only found between Pb and Cd in Durgapur, which indicates their common source and that, may be attributed to anthropogenic activities. Otherwise it may be inferred that independent behavior of the metals in ambient air and did not depict any influence of RSPM on the abundance of metals. Another interesting observation was that degree of metal contamination was mainly governed by the industrial activities because average metal content in PM_{10} was relatively higher in Durgapur which is industrial belt. These particulate along enriched with metals may be transmitted through nose and deposited in lung and create health problem. They also convert into another form through speciation and become available to the biological food chain, thereby affecting life, including human during chronic exposure.

Keywords: PM_{10} , heavy metal, toxicity, health effect.

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ROLE OF ENVIRONMENTAL FACTORS IN THE CAUSATION OF CONGENITAL HEART DEFECT PATIENTS

ANSHULA TANDON AND RADHA SARASWATHY

Congenital heart defects (CHD) are one of the most prevalent defects in the today's world and is one of the leading causes of the mortality world-wide. Abnormalities in heart formation, the most common form of human birth defects, afflict nearly 1% of newborns, and their frequency in spontaneously aborted pregnancies is estimated to be tenfold higher. There is relative importance of both genetic and environmental factors in the production of heart malformations. Environment plays a very significant role in the causation of congenital heart defects. The involvement of drugs, radiation and other environmental factors such as viruses, rubella, teratogens, drugs and hypoxia in the production of congenital heart malformations are well known. In the present study the correlation between genetic studies of 95 congenital heart disease patients and environmental factors were carried out. Out of the 95 cases studied 2% cases were born to fathers working in coal mines, 3% cases were the recurrent spontaneous abortions resulting from over dose of drugs by mothers, 1 case of chain smoker and 1 case due to rhinorrhea infection. The etiological factors underlying in the causation of CHDs is a complex. Therefore in this study an attempt has been made to evaluate the genetic and non-genetic factors in the causation of this defect to provide genetic counseling to the families under risk.

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TRENDS OF ACUTE POISONING- AN OBSERVATION BY NIOH-POISON INFORMATION CENTRE.

A B PATEL AND A DEWAN

A retrospective analysis of poisoning cases referred to the Poison Information Centre, NIOH for a period of two years (Jan 2007-Dec 2008) was made. The data were analyzed with respect to age, sex, route of exposure, mode and type of poisoning. The agents belonged to various groups: household products, organophosphate pesticides, other pesticides, industrial environmental chemicals, sedatives/hypnotics/anti-psychotics, other drugs, compounds of plant or animal origin, miscellaneous and unknown groups. The age ranged from less than 10 to 80 years, with the highest number of incidences in the range of 20-29 years (41.3%). Males (65.1%) outnumbered females (32.6%) in poisoning; no information was available from the rest. The most common mode of poisoning was suicidal (79.1%), the other modes being accidental (7.3%), occupational (4.5%) and homicidal (1.6%). The route of exposure was mainly oral (90.3%). Dermal and/or inhalation exposure contributed 5.1% to the total. The highest incidences of poisoning were contributed by the pesticides (65.9%) among which the major contribution was from organophosphate pesticides (35.2%). Household agents which included cleaning substances, cosmetics/personal care and other products contributed 3.8% followed by plants (3.8%), drugs (3%), industrial chemicals (1.7%), food poison (0.8%), animals (0.6%), miscellaneous groups (1.4%) and unknown (19.1%). Household products mainly comprised pyrethroids, carbamates, phenyl, shampoo, detergents, dettol, corrosives etc. Drugs implicated included benzodiazepines, anticonvulsants, analgesics, antihistamines, tricyclic antidepressants. Among the agricultural pesticides, organophosphates were the most common (35.2%) of which phorate, dimethoate, monocrotophos and chlorpyrifos were encountered most commonly. Copper sulphate and nitrobenzene were common among industrial chemicals. Poisoning due to plants was comparatively lower, but *Jatropha* was the most common since an incidence of mass poisoning occurred involving 25 children. An alarming feature of the study was the high incidence of poisoning in adults of age group 20-29 yrs (41.3%). Accidental mode of poisoning contributed 7.3%; and was most common among the children (50.7% contributing 50.7% of total accidental cases). Nine episodes of mass poisonings with high morbidity and mortality were also recorded affecting 62 people due to poisoning by compounds like organophosphate pesticides, gamaxin, or plants. The present data may not give an exact picture of the incidence of poisoning in India, but represents a trend in Gujarat state.

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EFFECTS OF CHEWING MIXTURE CONTAINING ARECA NUT AND TOBACCO ON ORAL HARD AND SOFT TISSUE

MAYUR JOSHI, GIRISH PARMAR, YOGENDRA VERMA, BC LAKKAD, AND SUNIL KUMAR.

Several health impairments are associated with food habits, life style and environmental factors. During the last two-three decades the tradition of chewing betel quid and areca nut has been shifted to new product i.e. pan masala (PM). Present study was aimed to analyse the clinical changes in oral dental hard and soft tissues, DNA damage and the role of metals among chewers and non-chewers. A total of 230 subjects attending the OPD, Govt. Dental College and hospital, were enrolled randomly and classified as chewers of pan masala plain (N=3), gutkha (N=38) and others (N=45) (Areccanut, Khaini, Mava etc.) or non-chewers (N=144). Subjects were examined clinically for changes in oral dental hard and soft tissues for oral lesion. Saliva and buccal mucosa cells were collected for metal and micronuclei assay, respectively. The effect of chewing habit on oral hard tissue i.e. dental attrition and staining of teeth were significantly higher in chewers as compared to non-chewers. The interincisor and intermolar distances were significantly lower in panmasala chewers and the chewers of other materials. The clinical observation of oral cavity of both chewers and non-chewers indicated that oral mucosal lesions were higher among chewers than non-chewers. The data on zinc revealed low levels (non-significantly) among oral submucous fibrosis (OSMF) subject with respect to control. Copper level was increased among chewers and OSMF subject with respect to non-chewers. Buccal MN was significantly higher in chewers and OSMF subjects than non-chewers. These results reveal that chewing material containing areca nut and tobacco having geno and cytotoxic property and effect on oral tissues.

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INTEGRATED HEMATOLOGY INDEXES AT PATIENTS WITH PROFESSIONAL TOXIC DUST BRONCHITIS IN MANUFACTURE OF PRIMARY ALUMINIUM

KASHANSKAYA E.P AND KASHANSKIY S.V

The qualitative and quantitative structure of peripheral blood leukocytes at group of the control (healthy, n=24), groups of risk of toxic-dust bronchitis (ÖDB) development in aluminium manufacture (n=38), in manufacture of alumina (n=19), at workers of alumina manufacture (n=19) with ÖDB (n=47) were analyzed. In the time of the analysis of integrated hematology indexes changes the statistically significant distinctions were revealed between the groups. At ÖDB patients-workers of aluminium electrolyse manufacture BAP and UAP on the parameters of index of the neutrophils and monocytes ratio (14.3 ± 1.8 and 10.9 ± 0.8 accordingly, $\delta = 0.001$). The index of the neutrophils and monocytes ratio was increased in the both groups that is explained by intensity compensation processes providing detoxication. Changes of other indexes had various characters; in comparison with the control group parameters the statistically significant distinctions were revealed. The index of lymphocytes and eosinophiles ratio in the group of ÖDB developments risk at aluminium electrolyse were greater than at patients in manufacture of alumina ($X^2 = 3.86$), that accounted for prevalence of immediate type hypersensitivity at ÖDB patients in manufacture of alumina. At attempt of search of correlations connections between the integrated hematology indexes, total dust loading, parameters of external breath function were studied at both groups. Was revealed correlation between allergisation index, parameter PEF1 and dust loading ($r = 0.32$), and weak correlation between parameter PEF1 and the general index ($r = 0.37$) in the group of ÖDB developments risk. In manufacture of alumina was revealed. Thus, the analysis hematology parameters allow indirectly estimating the immune homeostasis and the transition of adapting – compensating immunologic processes in damaging.

DETERIORATION OF SPERM MORPHOLOGY IN MEN EXPOSED TO HIGH TEMPERATURE IN GARMENT INDUSTRIES

PRABHU KUMAR DURAISAMY¹, K. SARAVANAN²

Globally, the incidence of infertility is estimated to be about 13–18% (Thonneau et al., 1991; Jones and Toner, 1993; Irvine, 1998) in the human population, regardless of race, ethnic group, etc. There are many work situations (such as work which is highly stressful, or shift work) that may cause negative effects on the reproductive systems of male and female workers. In normal conditions testicular temperature is maintained 3°C lower than the core body temperature and is an important prerequisite for efficient spermatogenesis. Germ cells and Sertoli cells are highly sensitive to elevated temperature. Occupational exposure to high temperatures adversely affects testicular function causing partial or complete spermatogenic arrest. This leads to oligo-astheno-terato-zoospermia (OAT) and azoospermia. Garment industry is one such industry where high temperature is evolved in various forms, for instance, the employees sewing garments sits continuously for 6 -8 hrs, which in turn results in increased scrotal temperature. This study reiterates that exposure to high temperature causes deterioration in sperm morphology and impairs motility

Keywords: Azoospermia, Oligozoospermia, Oligo-astheno- terato-zoospermia, Hyperthermia, Garment Industry

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THE SURVEY OF CONSULTATION EFFECT ON MENTAL HEALTH ON PREGNANT WOMEN REFERRED IN UREMIA HEALTH CENTERS

FATEMEH MOGHADDAM TABRIZI

Regarding adverse effects of mental disorders on relationship of pregnant women and mother – neonate relation as well as the relation between the couples, the importance of detecting practical & effective ways to prevent this disorder seems essential. To determine the role of the consultation in mental health. In this semi – experimental study 8 through a systematic randomization 200 pregnant women referred to uremia health centers in 2002 – 2004 were divided into 2 groups of 100. The case group received consultation about emotional and informational support of midwife in prenatal period. Finally on 9th month of pregnancy the mental health of the case group was compared with the control group. The results show that 81% pregnant women in case group before consultation in third Trimester of pregnancy and 80% of them after consultation in first Trimester were in usual range. Where 97% of pregnant women in control group in first Trimester and 93% of them in third Trimester of pregnancy were in usual range ($P = 0.004$). Consultation is an effective factor in preventing mental health disorders and presented by midwife it can considerably reduce mental health disorders.

Keywords: consultation , mental health , pregnant women

ANTIOXIDANT ACTIVITY AND ANTI-INFLAMMATORY ACTIVITY OF THE METHANOL EXTRACT AND ACETONE EXTRACTS OF WHITE TEA (INDIANS TEA) IN NILIGIRI. (CAMELLIA SINENSIS L.)

SHANMUGAPRIYA. K, NITYANANDI

White tea extracts were analyzed for total phenolics content ,antioxidant activities and anti-inflammatory activities measured in methanol extract and acetone extract .the ABTS,DPPH,FRAP,ORAC assays were used for determining antioxidant activities. Averaged methanol extract (μM trolox equivalent (TE) g fresh mass (FM)) were 40.55 ± 2.1 , 39.10 ± 2.2 , 32.52 ± 1.8 , 37.85 ± 2.4 as determined by the ABTS, DPPH, FRAP, ORAC assays respectively. Averaged acetone extract (μM trolox equivalent (TE) g fresh mass (FM) were 38.30 ± 2.2 , 29.90 ± 1.4 , 35.85 ± 1.9 , 26.45 ± 1.8 .as determined by the ABTS, DPPH, FRAP, ORAC assays respectively. Averaged methanol extract were determined by SOD and nitric acid radicals about 32.25 ± 0.08 and 12.10 ± 0.03 . Averaged acetone extract were determined by SOD and nitric acid radicals is estimated about 42.10 ± 0.06 and 13.50 ± 0.04 . In vivo anti-inflammatory activity of white tea at different concentration is determined is about 0.65, 0.09, 0.27 at 25*μ*l, 50*μ*l, 100*μ*l. The contents of the total phenolics in the methanol and acetone extracts were determined spectrometrically according to the Folin-Ciocalteu procedure and calculated as Gallic Acid Equivalents (GAE). The results from my study showed that the antioxidant activities of the white tea in methanol extract as determined by the total phenolics content, ABTS, DPPH, FRAP, ORAC assays (antioxidant activity) and in-vivo anti-inflammatory activity were higher than acetone extract .white tea leaves possess antioxidant properties and anti-inflammatory activity than other teas and could serve as free radical inhibitors or scavenger, and acting possibly as primary antioxidants. Phytochemical analysis of the white tea revealed that antioxidant activity and anti-inflammatory activity are mainly due to the presence of the phenolics compounds especially alkaloids and tannins present in white tea. The objective of this work was to determined the total phenol content and antioxidant activity and in-vivo anti inflammatory activity of white tea in Niligiri district, Tamilnadu.

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THE MUTATIONAL SPECTRUM OF PTPN11 (PROTEIN TYROSINE PHOSPHATASE, NON-RECEPTOR TYPE- 11) IN INDIAN PATIENTS WITH CHILDHOOD ACUTE LYMPHOBLASTIC LEUKEMIA

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The *PTPN11* gene encodes SHP-2, which is a protein tyrosine phosphatase functioning as a signal transducer downstream to growth factors and cytokine receptors and its function is Ras-mediated, at least in part, through the Ras/Raf/ERK cascade in hematopoietic and non-hematopoietic cells. Recently, it has been reported that somatic mutations in *PTPN11* in juvenile myelomonocytic leukemia (JMML). To investigate the prevalence of mutations in *PTPN11* in childhood acute lymphoblastic leukemia (ALL), we screened the hot spot of *PTPN11* in exon 3, 47 B-precursor ALL cell lines and, 14 T-cell ALL and 69 fresh samples, including 57 B-precursor ALL patients as well as 12 T cell, using polymerase chain reaction and direct sequencing analyses. In exon 3, mutations were observed in 4 of 47 (8.5%) B cell-ALL cell lines (Asp61Val and Glu76Gly). A missense mutation (Ala72Val) was detected in 3 of 57 (5.26%) B cell ALL patients (a 9-year-old girl with FAB-M0). However, we did not detect any mutations in exon 3 in 14 ALL cell lines and 12 ALL patients including 35 control samples. The screening of other coding regions is still undergoing although more than 90% of the reported mutations were clustered in exon 3. In conclusion, our data suggest that the *PTPN11* mutations are not only involved in myeloid hematological malignancies, involved in acute lymphoblastic leukemia (ALL) too.

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RADIATION DOSE FROM THE WATERBORNE RADIONUCLIDES TO THE RESIDENTS OF BANGALORE CITY, INDIA

SHIVA PRASAD N.G¹, NAGAI AH N², ASHOK G.V², MAHESH H.M³

Uranium is radiologically and chemically toxic, a nephrotoxic heavy metal exerting its detrimental effects by chemical action in the proximal tubules in humans. An exposure of about 0.1 mg/kg of body weight of soluble natural uranium results in transient chemical damage to the kidneys. Exposure to waterborne ²²²Rn (after a successive decay of uranium) may occur through ingestion (drinking water containing ²²²Rn) and inhalation (breathing of ²²²Rn gas which is released from house hold water) which pose potential health hazards. In view of these, potable water samples were collected from the city of Bangalore and analyzed for the activity concentrations of uranium and ²²²Rn using laser fluorimetry and emanometry method respectively. The uranium concentrations found to vary in the range of 3.5 – 515 ppb with the mean value of 104.43 ppb. About 40% of the samples showed elevated concentrations than the drinking water guideline value of 30 ppb as prescribed by WHO, rest within the permissible level. Radiation dose due to the intake of uranium through the drinking water was estimated for various age groups of 0 – 6 m, 7 – 12 m, 1 – 3 y, 4 – 8 y, 9 – 13 y, 14 – 17 y and above 17 years using IAEA dose coefficients and the prescribed water intake rates. The annual effective radiation dose for various age groups varies in the range of 4.26 – 1252.08 μ Sv/y. It was observed that, the mean effective dose to the age group of 7 – 12 months is relatively high compared to other age groups. The concentration of ²²²Rn was found to be in the range 7.55 – 208.77 Bq/l with a mean value of 58.66 Bq/l. About 95.4% of the samples exhibit the activity greater than the maximum contaminant level (MCL) of 11 Bq/l as suggested by USEPA. From the measured concentration of ²²²Rn, the effective dose to the lungs and stomachs of the population of the region was estimated using the dose conversion factors given by ICRP. The effective dose (lung and stomach) is found to vary from 60.82 to 1681.86 μ Sv/y with a mean value 472.55 μ Sv/y. The observed mean value in the present investigation is well within the maximum permissible exposure level of 500 μ Sv/y (exclusively for radon and its daughters) as prescribed by BARC India for Indian environment. The results of the present investigation are compared with the literature values and are presented and discussed in detail in this paper.

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RADIATION DOSE TO THE RESIDENTS OF BANGALORE ENVIRONMENT FROM INDOOR ^{222}Rn EXPOSURE

ASHOK G V¹, NAGAIAH N¹, SHIVA PRASAD N G²

^{222}Rn , a radioactive inert gas is a large component of the natural radiation that humans are exposed to, can pose a threat to the public health when it accumulates in poorly ventilated residential and occupational settings. About half of the total radiation effective dose (2.5 mSv/year) to the general public is due to the irradiation of the lungs by alpha particles following inhalation of ^{222}Rn decay products. The continuous exposure to higher levels of radon and its progeny may lead to malignant transformation which results in lung cancer. Radon is found to be the most relevant cause of cancer diseases related to respiratory tract among non-smokers. It also increases the incidence of all histological types of lung cancer, including small cell carcinoma, adenocarcinoma, and squamous cell carcinoma. In view of the above, indoor radon concentration measurements were carried out for 1 year in various dwellings situated around Jnanabharathi Campus, Bangalore using LLRDS (Low Level Radon Detection System). Results show that, the annual average concentrations in the dwellings during 6.00 hr, 14.00 hr and 22.00 hr were found to be 42.6 Bq m^{-3} , 15.3 Bq m^{-3} and 28.5 Bq m^{-3} respectively. The overall range, annual mean value of radon concentrations and the inhalation dose to the inhabitants of the dwellings were found to be $2.8 - 152.2 \text{ Bq m}^{-3}$, 25.4 Bq m^{-3} & 0.67 mSv y^{-1} respectively. In addition the gamma exposure rate was also measured in all the dwellings using G M tube based Environmental Radiation Dosimeter. It was found to vary from $16 \text{ mR/hr} - 24 \text{ mR/hr}$. From the mean value of radon concentration an attempt was made to compare the doses to different organs and tissues. From the calculations ('Type M') it was found that lungs, extr. thoracic kidneys receive higher doses compared to other parts of the body and effective dose to a child of 10 year was found to be slightly higher compared to 1 year Infant.

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EVALUATING EFFECTS OF OBTAINING ORGANIC FERTILIZER FROM ANIMAL AND BIRD WASTES ON ENVIRONMENT

HOSSEIN ISMAEILI GHOLZOM

Today, it has approved that using chemical fertilizer is caused elimination of soil and its fertility in long term period so that using organic fertilizers that are obtained from the nature is prevailed again in most developed countries, unfortunately, it is not paid attention efficiently in many country. In Iran despite of rich resources of organic materials and these valuable resources are wastes without application. Experience and knowledge have approved that approximately 90% of all organic materials of human environment are recycled and entered correctly into Natural cycle. This method is actually use and change of organic materials existing in the nature by using different microorganisms in the exposure of moisture and heat in aerial conditions. This research is in context of evaluating environmental effects of building SHOMAL – KOOD-KAZER animal compost company and its main purpose obtaining organic fertilizer from animal and bird wastes in khorasan shomali province. In this research, we try to evaluate two options of execution and no execution of this plan by Leopold matrix after collecting the information and possible effects of this plan on region environment are reviewed after completing inventory tables and finally, option of executing plan by observation of all anticipated environmental considerations and measures in building shomal – cood- khazar animal compost company is concluded.

Keywords: Environmental, Chemical fertilizers, Organic fertilizer, Animal compost, Environment, Leopold matrix

DISEASE, DIAGNOSTIC AND TREATMENT OF POLYCYSTIC OVARIAN SYNDROME

SUBHASHREE RAJAN, V.SRIPRIYA

Polycystic Ovarian Syndrome is an endocrine disorder where the ovaries do not produce sufficient quantities of hormones that are required for the follicles to mature. As a result, the follicles remain in the ovary and eventually turn into cysts. These cysts accumulate in the ovary, thus it leads to reproductive dysfunction in which a woman ovulates infrequently or not at all because the ovarian follicles become arrested in their growth. This causes disruption of the menstrual cycle. This paper deals with symptoms, causes, risk factors, diagnoses and treatment of PCOS. The main aim of the paper is to coin the statistical report about the prevalence of PCOS, for instance about 5% to 10% of women of childbearing age have PCOS (ages 20-40) and 30% of women have some symptoms of PCOS. Also creates awareness among all groups of people to lead a healthy life.

THE EFFECT OF HIGHLY ACTIVE ANTIRETROVIRAL THERAPY (HAART) ON LIPID PROFILES AMONG HIV-INFECTED PATIENTS

MD KHAZA TAMEWARUDDIN¹, K. LAXMI PRASAD² AND M. ESTARI³

Protease inhibitors are known to alter the lipid profiles in subjects treated for HIV/AIDS. However, the magnitude of this effect on plasma lipoproteins and lipids has not been adequately quantified. To estimate the changes in plasma lipoproteins and triglycerides occurring within 12 months of initiating PI-based antiretroviral therapy (HAART) among HIV/AIDS afflicted subjects. We included all antiretroviral HIV-infected persons treated at Govt. Hospital, RIMS (Rajeev Gandhi Institute of Medical Sciences), Adilabad district of Andhra Pradesh, who initiated therapy with protease inhibitor antiretroviral (ARV) drugs between March 2008 and February 2009 and who had at least one plasma lipid measurement. Longitudinal associations between medication use and plasma lipids were estimated using mixed effects models that accounted for repeated measures on the same subjects and were adjusted for age and sex. We estimated the changes in the 12 months following any initiation of a PI based regimen. A total of 220 eligible subjects were dispensed protease inhibitor antiretroviral (ARV) therapy. Twelve months after treatment initiation of PI use, there was an estimated 20% increase in total cholesterol and 22% increase in triglycerides. Twelve months after treatment initiation with PIs, statistically significant increases in total cholesterol and triglycerides levels were observed in HIV-infected patients under conditions of standard treatment. Our results contribute to the growing body of evidence implicating PIs in the development of blood lipid abnormalities. In conjunction with the predominance of men, high rates of smoking, and aging of the treated HIV-positive population, elevated lipoproteins and triglycerides may mean that patients such as these are at elevated risk for cardiovascular events in the future.

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SERUM LIPIDS AND LIPOPROTEIN CONCENTRATION AMONG TYPE 2 DIABETIC PATIENTS

ESTARI M, T. BIKSHAPATHI, A. SRINIVAS REDDY AND M. KRISHNA REDDY

The aim of this study was to assess lipids and lipoprotein (a) profile in type 2 diabetes mellitus (DM) and to correlate the values with various risk factors. This case-control study was conducted in the patients of private Diabetic Care Centre, Warangal, Andhra Pradesh state from May 2007 to November 2008 in 214 cases (with diabetes) and 214 controls (without diabetes) aged 25 to 65 years, males and females. Face-to-face interviews were based on a questionnaire that included variables such as age, sex, family history, physical examination, fasting blood glucose, lipids, total cholesterol (TC), HDL, LDL and triglycerides (TG) analysis. The age, male gender, BMI, obesity, WHR (Waist Hip Ratio) were higher in diabetics. The prevalence of hypertension was associated with the presence of diabetes (29% for diabetics vs. 4% for control group). Diabetic patients had significantly higher TC; TG and LDL. In diabetic patients, Lp (a) correlated with total cholesterol ($r=0.296$), LDL-C ($r=0.285$), but marginally significant with ApoB ($r=0.573$), TG ($r=0.288$), and LDL-C ($r=0.584$). Similarly, ApoA1 significantly correlated with TC ($r=0.292$), LDL-C ($r=0.305$) and HDL-C ($r=0.565$). The present study revealed that obesity, total cholesterol, reduced HDL-cholesterol and triglyceride were more prevalent in diabetic patients. Furthermore, this study has reported that diabetes state does not increase plasma Lp (a) concentrations and fail to show any association of Lp (a) levels with glycemic control in type 2 diabetic patients.

EFFECT OF TOXIC STRESS ON LIVER FUNCTION OF ARSENIC EXPOSED HUMAN

DALAL. B, GANGOPADHYAY. P.K. AND A.K. MUKHERJEE

Exposure to arsenic through contaminated drinking water is considered as one of the environmental health hazards leading to toxic stress on internal organs as manifested by symptoms and signs. Little information is available on the toxic stress on the bio-indicators of the liver function of the arsenic (As) exposed human. The aim of the present study is to assess the hepatic enzyme activity in relation to stress developed by arsenic exposure in a concentration dependent manner. Serum aspartate transaminase (AST), particularly of the female subjects, increased significantly ($p < 0.05$) with increasing arsenic concentration in drinking water. Rising trend of blood glucose and serum alkaline phosphatase (ALKP) activity was exhibited with rise in arsenic concentration. Serum uric acid (UA) of the subjects was above normal range, particularly in male subjects of the tested population. Declining trend of hemoglobin was also observed with increasing concentration of arsenic in water. Palpability of liver, mainly in males, was also shown to increase with increase in concentration of arsenic in drinking water. Exposure-induced rise in other manifestations was also noted. Clinically detected arsenicosis cases showed higher values of serum AST, ALT, ALKP, and UA. Our study reveals that arsenic exposure generates toxic stress on the liver indicated by elevation of hepatic enzymes.

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ASSOCIATION BETWEEN URINE-Cd AND URINARY -TOTAL PROTEIN IN CADMIUM PLATING WORKERS

RAVI BABU. K¹, H.R. RAJMOHAN¹ AND M. KARUNA KUMAR²

The present study was carried to investigate the association between urinary -Cd and indicators of renal dysfunction (serum creatinine, BUN, urinary creatinine and protein) in workers exposed to cadmium from cadmium plating process. The urinary cadmium level was used as an indicator of body burden. The levels of serum creatinine, blood urea nitrogen, urinary creatinine and total protein used as indicators of renal dysfunction. These parameters were determined in 50 exposed workers and 50 administrative workers residing in the same city, but away from the place of cadmium plating. The association between urinary-Cd and indicators of renal dysfunction among study subjects done by using multiple regression analysis. The levels of urinary total protein among cadmium-exposed workers were significantly ($R^2=0.300$, $\hat{a}=6.280$ and $P=0.00$) associated with urinary-Cd levels as compared with serum creatinine, BUN and urinary creatinine. The levels of urinary total protein could be used as renal dysfunction biomarker in cadmium exposed workers as compared to other parameters.

Keywords: Urine cadmium indicators of renal dysfunction, Cadmium plating

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OCCUPATIONAL HAZARDS IN DENTISTRY

SAINATH M.C.

Professionals in dentistry are exposed to many potentially hazardous factors during their practice. The occupational hazards related to dental procedure are reviewed. Various occupational hazards based on their source of risks are classified and identified with their associated pathology. Elimination or minimizing of risks factors and their effects are discussed. Hazardous factors like exposure to physical factors, chemicals, biological factors and ergonomic consideration, psychological stress are highlighted.

ORAL MANIFESTATIONS OF VARIOUS OCCUPATIONAL DISEASES

MURALI GOPIKA MANOHARAN G.V

Occupation is the means of livelihood of an individual. Although one's occupation earns him livelihood, prolonged exposure to various physical, chemical and biological agents due to occupation itself, predisposes an individual to various ailments, which in turn, may make him sick, causing inability to pursue his work. There are various occupational diseases and many of them have their manifestations in the oral cavity, which may be helpful in their early diagnosis, helping in early intervention also. This paper discusses the oral manifestations of various occupational diseases and their diagnosis and management.

URBANISATION AND SUSTAINABLE ENVIRONMENT

SMRITI BHOSLE

Environmental health is concerned with all aspects of the natural and built environment that may affect human health. It comprises those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social, and psychosocial factors in the environment. It also refers to the theory and practice of assessing & controlling factors in the environment that can potentially affect health of present and future generations. We live in a world that is changing very rapidly. The pollution of our land, air and water has caused changes and the natural resources are diminishing rapidly as the process of urbanization moves across country-sides. Every single one of us depends on the planet, and every single one of us is responsible for its survival. Changing the ways in which we live in can be very difficult, but it is possible. The ways that we grow our food, produce our goods and power our homes and cities are depleting resources, polluting the planet and drastically reducing the biodiversity of our planet. By increasing our respect for nature in all its incarnations, we will have taken a big step towards building a sustainable future. Sustainable living will protect the resources that help us to live and enjoy life for future generations. Urbanization and economic growth go hand in hand; ironically however, rapid urbanization is also associated with an increase in the growth of unplanned communities (slums) thus presenting a challenge for providing a sustainable environment (inclusive, productive, efficient and manageable) without impeding economic growth. Urbanization is necessary, no doubt but urban planning and foresight can minimize the damage to environment; this requires formulation and enforcement of relevant policies. There are no simple explanations for the environmental problems and no simple solutions. We have no choice but to work on both the causes and the symptoms simultaneously. There is an urgent need to emphasize preventive approaches. Thus, this paper focuses on the major environmental issues that affect urban life, discusses the difficulties that may be encountered in the course of reaching out to the goal of healthy environment & also highlights the preventive measures adopted by the Government, NGOs & the local administrative bodies for building healthy environment conducive to personal, social, and community health.

POTENTIAL FOR REDUCING GREENHOUSE GASES AND AIR POLLUTANTS FROM OIL REFINERIES

KARBASSI A.R AND GH. R. NABI

Oil refineries are one of the major sources of Greenhouse gases emission. Iran has to invest 95 billion US\$ for her new oil refineries to the year 2045 for production of gasoline. At present the emission factors for CO₂, NO_x and SO₂ are 3.5, 4.2 and 119 times higher than British refineries, respectively. In order to have a sustainable development in Iranian oil refineries, the government has to set emission factors of European Community as her goal. At present CO₂ per Gross Domestic Production (GDP) in the country is about 2.7 kg CO₂ as 1995's US\$ value that should be reduced to 1.25 kg CO₂/GDP in the year 2015. Total capital investment for such reduction is estimated at 346 million US\$ which is equal to 23 US\$/ton of CO₂. It is evident that mitigation of funds set by Clean Development Mechanism (about 13 US\$/tons of CO₂) is well below the actual capital investment needs. Present survey shows that energy efficiency promotion potential in all nine Iranian oil refineries is about 165,677 MWh/year through utilization of more efficient pumps and compressors. Better management of boilers in all nine refineries will lead to a saving of 273 million m³ of natural gas per year. In the year 2008 the overall CO₂ emission within country was about 500 million tones.

Keywords: Emission factor, Global warming, Oil refinery, Pollutants, Iran

GREENHOUSE GAS REDUCTION THROUGH IMPLEMENTATION OF GREEN MANAGEMENT CONCEPTS IN SPORT COMPLEXES

MEHRDADI. N., KARBASSI. A. R. AND GH. R. NABI BIDHENDI

One of the best methods to combat greenhouse gases is to implement energy saving concepts. In the present investigation, it is tried to compute energy consumption in sport complexes and subsequently to provide methods for reduction of energy consumption. Enghelab sport complex (ESC) in Iran is selected for this study due to its size and long-term activities. Due to the comprehensive plan of the aforesaid sports complex, numerous centers and departments were established in this site in order to materialize its envisioned sports, recreational and cultural objectives. The results of the questionnaires distributed amongst the members and the personnel of the complex revealed that approximately 50% occupants were not acquainted with green management and only 30 % were faintly familiar with it. The personnel's knowledge on green management was much better and about 64% of them were well acquainted with the related issues. Total amount of solid waste produced in the complex is about 547.5 tons/yr. in 2004; constituents are plastic (24.1%), putrescible materials (45.9%), glass (7.6%), paper (19.3%) and metal (3.1%). According to the economic analysis conducted, the investment required for implementation of all the solid waste separation techniques amounts to US\$ 11200. The result of present investigation is indicative of a medium level of optimization for energy and water consumption in ESC and there is a high potential to improve the efficiency of the system.

Keywords: Green management, Global warming, environment, sport complex

THE NUMERICAL EVALUATION OF LOW LEVEL JETS FORMATION IN LUT VALLEY REGION IN WINTER

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Low Level Jets (LLJ) because of their importance to air-pollutant transport, aviation safety, wind energy production, deep convection activities and cyclogenesis is of great interest. The LLJ in the Lut Desert valley and the Jaz Murian dry lake is worthy of study since it can cause hazardous operating conditions in the region in terms of dust mobilization and turbulence. The convergent topography of the Lut valley with the valley-parallel pressure gradients generated by the large-scale processes and by the presence of cold air over the valley's sloping terraces can create low level jets. In this paper a dynamical synoptical case resulting Low Level Jet formation in the region with the velocity more than 14 km in winter 2006 has been studied. In the numerical study the regional MM5 model with the nesting of 4 km and 12 km and Basra station as nest center has been used and the outputs of Global forecasting Model (GFS) were considered as input for this model leading to achieve an appropriate dynamical analysis of flows in the region in winter. The results of this study indicate because of the existence of cold air masses in the region in winter, the average speed of low level jets would be decreased. At this time downslope flows plays a key role in creating the night low level jets.

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PILOT PLANE INVESTIGATION OF DOMESTIC WASTEWATER TREATMENT BY COMBINED ANAEROBIC PONDS AND WETLAND

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The treatment of domestic sewage in natural systems such as waste stabilization ponds and constructed wetlands is considered as one of the most popular methods for small communities in rural and urban regions. Combined optimized anaerobic ponds and subsurface flow wetlands may be a solution, and are growing in popularity as a natural and economical alternative for purifying wastewater. This research was initiated to define the knowledge available on the treatment of municipal wastewater by combined anaerobic ponds and wetlands. To determine the treatment capacity of combined system, a pilot scale of anaerobic ponds and subsurface flow wetlands was constructed, and was investigated over period of one year. The anaerobic pond systems consisted of two ponds, a conventional pond and an optimized pond which were combined with two subsurface flow wetland respectively. The conventional pond were built in common method and the optimized pond in two parts, Part one as digestion with 12 hours detention time and part two as anaerobic baffled pond with 8 across baffles and 36 hours detention time. Hydraulic detention time for wetland was considered 2 days. The wastewater was provided by municipal network in wastewater treatment plant of Sabzevar city. Weekly water samples at the inlet and outlet of each component of the combined system were analyzed for biochemical oxygen demand(BOD_5),total suspended solid(TSS),total kjeldal nitrogen(TKN),total phosphor(TP) and total coli form(TC).The average removal efficiency of conventional and optimized ponds combined with wetland are as follows: BOD_5 (68.5%-88%),TSS(82.6%-96.3%),TKN(83%-93.2%),TP(83%-91%)andTC(94%-98%) respectively.

Keywords: Constructed Wetland, Anaerobic Pond, Pilot plane, Hydraulic detention time, Domestic Wastewater.

TRACING THE SPATIO TEMPORAL PATH OF PEAK MALARIA INCIDENCES USING WALK ANALYSIS AND GIS

PRASHANTHI DEVI. M¹, HARATHI P.B², VALARMATHI. S² AND BALASUBRAMANIAN.

Epidemic risk is a dynamic phenomenon with changing geographic pattern based on the temporal variations, in determinant factors including weather and other eco epidemiological characteristics of area at high risk. Epidemic early warning systems should take account of non uniform effects of these factors by space and time and hence temporal dimensions could be considered in spatial models of epidemic risks (Abeku, 2004). Based on this concept, the present study aimed to analyse the geographical based time expansion of malarial transmission. Monthly malaria incidences data for a period of 101 months (Jan 1996- May 2004) recorded from Salem district, India were used for the study. To estimate the spatial effects based on two components i.e., the overall difference among the regions and the rate of change over time for these regions a spatio-temporal analysis for fixed and random effects are performed. The model was used to identify if additional cases are coming from malarial predominant areas (High Incidence areas) from moderate areas, or from low incidence areas. The conditional auto regressive model is used to model the random effects. Correlated Walk and Random Walk analysis is used to show the movement of the disease over time. Markov Chain Monte Carlo simulation is used to obtain estimates of the posterior and predictive quantities of interest. CrimeStat is used to analyze statistically and Arcview 3.2 is used to map the results at different time periods and maps of smoothed time incidence. The results have significant implication over space and time and can be used for malaria control activities in the study area and also other infected areas. Based on the time and space aspect, the regional malarial control authorities have an opportunity to assess the risk of encountering the disease infection and to plan preventive measures accordingly. This study also provides an indication to any association between time trend and basic malarial incidence.

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THE EFFECT OF DIET ON RISK OF CANCER IN THE WESTERN PART OF TAMILNADU, INDIA: A GIS BASED RISK ASSESSMENT STUDY

HARATHI P.B, PRASHANTHI DEVI M¹, VALARMATHI S AND BALASUBRAMANIAN S

Diet habits play a key role in the health of person with the time, type and method of intake of food. Several studies have been carried out to study the influence of diet on the risk of cancer among various populations. Geographic Information Systems (GIS) technologies are evolving rapidly and increasingly used for mapping disease occurrence as a way to explore spatial and temporal patterns. Specifically, the use of area-level socioeconomic factors, person habits and multilevel geographic approaches has been recommended to help evaluate single or multiple influences on cancer incidence and other cancers and health conditions using statistical and spatial analysis. The present study attempts in mapping the dietary influences on the risk of cancer among 3000 patients screened for cancer at Coimbatore, India. Information such as the age of the person, sex, marital status, and tobacco use history, year of cancer diagnosis, and stage and grade of tumor were extracted from the incidence data. Spatial maps were prepared using GIS to identify the influence of diet on the risk of cancer. The result shows significant variations in diet habits and the cancer risk among different stages of diagnosis. These geographic spatial patterns inform and may facilitate the design of intervention programs to target areas of exposure.

Keywords: Diet influence, Cancer, GIS

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SPATIAL AND TEMPORAL VARIATION OF SICKLE CELL DISORDER AMONG ETHNIC POPULATIONS OF NILGIRIS REGION USING GIS

BRINDHA B, MANJU MENON AND PRASHANTHI DEVI M

Sickle cell anemia is a genetic abnormality whose control and cure are still under medical research. Sickle cell disorder refers to those states in which the red cell undergoes sickling when it is deoxygenated. The term sickle cell anemia is reserved for homozygous state of the sickle cell gene while sickle cell trait, which has never been considered a disease, has one normal and one abnormal gene. Despite major advances in our understanding of hemoglobin disorders, thousands of infants and children with these diseases are dying through lack of appropriate medical care. In the forthcoming years, the number of young cases will increase as a result of a reduction in childhood mortality, more babies with hemoglobin disorders will survive to present for treatment, thus steadily expanding the population of patients on long term therapy. Moreover, patients with sickle cell anemia are more prone to other types of infections rather than the disorders caused by the disease itself.

India caters to nearly 20 million people with sickle cell disease. The sickle cell gene in India was first described among tribal groups in South India by Lehmann H, Cutbush M (1952). Since then vast research has been done to understand the disease among tribal populations. Nilgiris region is high altitude region in southern India which is known for its ethnic tribal culture. The region houses around seven tribal communities accounting to about 50% of the total population where a high intensity of Sickle cell cases is observed. The present study aims at mapping the spatial distribution of sickle cell disorder among the tribal population of Nilgiris and to identify the temporal trend of the disease using Geographical Information Systems. The results show spatial variation among the disease in tribes of Nilgiris and temporal trend shows a gradual pattern. The cluster helps us to identify geographically ethnic regions where the disease and trait are confined to. Based on this, strategic options such as decreasing gene frequency and disease management can be suggested. Though the first option is not feasible for small communities, genetic counseling can be suggested on demand.

Keywords: Sickle Cell Anemia, GIS, Tribal, Spatial and Temporal Analysis

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AN INTERVENTION STUDY ON KNOWLEDGE OF GLOBAL WARMING AMONG SCHOOL STUDENTS OF KOLKATA

DEBJIT CHAKRABORTY, DWAIPAYAN MOJUMDAR, GOUTAM GHOSHAL, NARENDRANATH NASKAR

In this era of globalisation, almost everyone of us is familiar with the term "Global Warming", but the correct knowledge of the same among us is not beyond question. Global warming though started decades ago, but along with the advancement of civilisation, its impact on environment and human health have become so huge that it is threatening the human existence as a whole. In this regard, it is important for today's school students to have the correct knowledge since their future role in combating this grave problem is going to be very crucial. From this perspective, this institution based intervention study was conducted among the school students of kolkata to assess their existing knowledge on global warming and the effectiveness of knowledge incorporation among them. A pre-tested, self reported, questionnaire (20 marks) was applied to 135 school students of two different classes. A simple, knowledge based intervention was prepared and provided to one group (intervention group), chosen randomly. Other group remained as control group. Following intervention a repeat knowledge assessment was done using the same questionnaire.

The results reveal that in the first assessment of 135 students, mean score is 5.07 & SD is 2.053. No significant knowledge difference is found in relation to their age and sex. Following Post Intervention evaluation, the intervention group shows highly significant (paired $t_{67} = 14.20$, $P < 0.001$) improvement in their scores. Control group does not show any significant improvement. Hence, this type of knowledge based intervention programme proves to be effective to enhance the general awareness which may help to bring an attitudinal change towards mitigation of this alarming problem.

Keywords: Global warming, Knowledge, Intervention, Student

ROLE OF LIFESTYLE AND ENVIRONMENTAL FACTORS IN HUMAN MALE REPRODUCTION

SHIVA MURARKA¹, HARESH DOSHI², VINEET MISHRA³, ANIL GAUTAM¹ AND SUMAN KUMAR¹

Several reports have shown a decline in semen quality over the past few decades. There are sufficient evidences of increasing trends in a number of human health problems like cancer, reproductive and developmental defects, cardiovascular problem etc. due to lifestyle, environmental or occupational factors. In recent years, lifestyle factors such as use of tobacco, smoking and chewing, alcohol, caffeine, high temperature, number of dietary components, stress, and some modern electronic gadget on deterioration of reproductive health is receiving great attention. These factors may impair male fertility by interfering with spermatogenesis, sperm motility, sperm DNA and chromatin integrity or by reducing the fertilizing capacity of spermatozoa. The present study was conducted to assess the role of lifestyle and environmental factors on semen quality. Sixty subjects were enrolled randomly from the OPD of obstetrics and gynecology department, Civil hospital and IKD, Ahmedabad. Semen analysis was carried out as per the WHO criteria. Sperm viability and DNA / chromatin integrity was assessed by MTT, Aniline blue, Toluidine blue assay respectively. The subjects were categorized on the basis of sperm count and about 61% were normozoospermic, 27% were oligozoospermic and 12% were azoospermic. The data suggests that the lifestyle and environmental exposure to toxicants plays an important role in declining semen quality, which was more prominent in the subfertile group. Further work is in progress by enrolling more subjects.

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USE OF BIOMARKERS IN EVALUATION OF HEAVY METAL CONTAMINANTS IN MARINE FISHES

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Biomarkers provide an integrated, comprehensive early warning signal on the biological availability of the contaminants. A research exercise to study select biomarkers such as Metallothionein and metallothionein like proteins and GST activity for Cu, Zn and Cd contamination in select species of marine fishes such as *Sardinella longiceps*, *Nemipterus japonicus*, *Rastrelliger kanagurta*, *Chlorophthalmus agassizi* and *Cynoglossus macrolepidotus* available at Coimbatore supplied from Cochin coastal area, Kerala and Rameshwaram, Tamil Nadu was conducted at Ecotoxicology Division, SACON, Coimbatore. A total of 256 individuals of the above mentioned species were examined for metal contamination and biomarkers in all vital tissues, using standard operating protocols. On an average, *R.kanagurta* recorded the maximum concentrations of Cu (1.90 ± 0.16 ppm) followed by *N.japonicus* (1.71 ± 0.13 ppm). *S.longiceps* scored highest mean levels of Cd (0.12 ± 0.02 ppm) and Zn (30.19 ± 2.97 ppm). Significant variation in metal contamination among species ($P < 0.05$) goes with their relative feeding habits and habitats. The levels of Zn in *S.longiceps* can be treated as background levels as it matches with the earlier reported values with no apparent adverse effects. The levels of Cu and Cd are comparably low with the earlier reported levels elsewhere. Biomarkers such as MT and MT-like proteins were found to be maximum in hepatic ($15.91 \pm 4.86 \mu\text{g/g}$) and renal ($24.69 \pm 3.89 \mu\text{g/g}$) tissues of *R.kanagurta* and *C.agassizi* respectively. A significant strong positive correlation was observed between MT and Cd levels which indicated that increase in metal ions increases MT synthesis. Highest GST activity was observed in *N.japonicus* (2187.38 ± 947.0 n moles/ min/ mg protein) with no significant correlation between GST levels and metal contamination. Further, the ratio of actual Cd to theoretical maximum Cd-MT did not exceed '1' in all the organs of all the species examined. Thus, there was a clear induction of MT in all tissues, which was much adequate to bound all Cd. Thus, MT & MT-like proteins should have taken a sentinel role in binding all the metals and appear as promising biomarker. Although the health of the fishes appear to be safe other intervening factors such as specific isoforms of MT, metal species or the form and many other contaminants influencing the health status of fishes need further investigation.

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EFFECT OF METHYLPARATHION (ORGANOPHOSPHORUS INSECTICIDE) ON ACETYLCHOLINESTERASE ACTIVITY AND MUSCLE PROTEINS IN FRESHWATER FISH *LABEO ROHITA*

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Methylparathion (MP) is an organophosphorus insecticide used world wide in agriculture due to its high activity against a broad spectrum of insect pests. The aim of the study is to understand the effect of methylparathion on the lipid peroxidation, glutathione S- transferase (GST), acetylcholinesterase (AChE) in liver and muscle proteins viz., Sarcoplasmic (SP) and Myofibrillar (MF) proteins in *Labeo rohita*. The fresh water fishes (*Labeo rohita*) were exposed to three different sublethal concentrations (0.25, 0.5, 1.0 mg/L) of the Methylparathion and its action was evaluated in the tissues. At 15 days Methylparathion concentration (1.0 mg/L) LFT levels increased by two fold and 45 days almost five fold increases ($p < 0.05$) was noticed compared to the control. The sarcoplasmic and myofibrillar proteins were evaluated with increasing concentration of methylparathion as well as duration of exposure. The muscle protein levels as such did not show any significant difference on exposure to methylparathion at concentrations of 0.25. The sarcoplasmic protein content more or less remained unchanged even after 15 days of exposure, but higher concentration (1.0 mg/L) showed moderate increase (23%). The myofibrillar protein concentration continuously increased ($p < 0.05$) with increasing concentration of methylparathion. However at 0.25mg/L sub lethal concentration, no significant alteration was observed in enzymes and muscle proteins of the tissues. The results of the study indicate that changes in enzymes activity and decrease in the AChE activity can be used as biomarkers for monitoring toxicity due to methylparathion exposure in aquatic systems.

Keywords: Methylparathion, *Labeo rohita*, Enzymes, Sarcoplasmic (SP) and Myofibrillar (MF) proteins

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BEHAVIOUR OF SOME PESTICIDE RESIDUES IN CAPSICUM GROWN IN POLYHOUSE

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Off-season vegetable production under protected conditions is gaining popularity especially for growing high value vegetables such as capsicum, lettuce, bottle brinjal etc. Capsicum is grown in poly houses in more than 50 acres of area in and around Bangalore. Thrips are one of the important pests of this crop especially in the polyhouse environment and acephate is an insecticide which is very commonly used to control thrips infestation in capsicum. Since environmental factors such as temperature, wind drift losses, volatilization, incident UV radiation etc. are different in polyhouse cultivated capsicum as compared to open field cultivated capsicum, the insecticide acephate and its methamidophos metabolite residues were evaluated following its application @75g a.i./ha for four weeks at weekly intervals in polyhouse grown capsicum and compared to an open-field capsicum crop. Residues in fruits harvested in the polyhouse were higher initially (0.40 ppm) than in field (0.18 ppm) but within 10 days the residues became comparable (0.02 ppm). This could be due to higher rate of growth of capsicum in polyhouse resulting in residue 'dilution'. Residues dissipated to below detectable limits (0.01 ppm) within 21 days in open field and 25 days in polyhouse with half lives of 3.9d and 4.7d respectively. Methamidophos residues were detected in open field grown capsicum between 2 and 5 days after last application while the same were detected in polyhouse grown capsicum for a longer time viz. between 0 and 15 days. The waiting period for acephate residues in open-field capsicum was determined to be 12 days considering MRL(EU) of 0.02 ppm while that in polyhouse grown capsicum was 16 days. Thus lesser number of acephate sprays may be recommended in polyhouse for obtaining a safe produce.

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ASSESSMENT OF LEAD CONTAMINATION ON SPINACH (*SPINACEA OLERACEA*) THROUGH MOTOR VEHICLE EMISSION NEAR BY ALLAHABAD CITY

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Lead (Pb) may be present as a deposit on the surface of the vegetables, or may be taken up by the crop roots and incorporated into the plant tissue. In either case the original source of the pollution may be from water borne sources (such as industrial effluent) or from industrial vehicular air pollution. The present study assessment of the level of lead in Spinach (*Spinacea oleracea*) was carried out in the month of March and April 2008 at the Allahabad. For this study three similar sites (two highway sites and one control site) were selected where spinach was grown at the same time. The samples of soil and spinach were collected at three different distances i.e. 15, 30 and 45 meters from the roadsides. Concentration of lead in soil and spinach were analyzed using Atomic Absorption Spectrophotometer (AAS). The concentration of lead in soil and the plant ranged between 9.0 mg/kg to 23.95 mg/kg (soil) and 2.5 mg/kg to 5.0 mg/kg (spinach). The concentration of the lead in the plant was in the series Site1>Site2>Site3. The level of the lead in the soil and plant at highway was higher than the level of control site. The lead in the soil and plant may be recognized as pollutant which is released from vehicular emissions, because both the highway sites located in high vehicular traffic area. Permanent emission of lead from vehicles that utilize leaded petrol may increase the higher level of this metal in soil, spinach and other plants. The study reveals that some of the grasses and plants nearby highway, are also consumed by cattle and other animals which can be a source of many diseases in human beings through translocation of this lethal pollutant.

Keywords: Lead, highway, Spinach, AAS, translocation

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URBAN AIR POLLUTION IN COIMBATORE CITY

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The resultant dynamic growth in industrial, transport and agriculture sectors besides increasing immigration has created ambient air pollution problem in major urban growth centers of India. Now there is more awareness than ever before that positive activities are needed if we are to meet the challenges of serious ecological imbalance facing the entire humanity in near future. In an attempt to manage urban air resource, it is necessary to have reliable information on the ambient air concentration levels that prevail in different activity zones of the urban growth centers. The air quality status of this city has been monitored at three different areas under the following classification as residential (Saibaba Colony & Ponnaiya Rajapuram), industrial (Kurichi SIDCO office) and mixed category (District collector office). It was observed that there was a reduction of SPM level by 40% during 2008-2009 residential area when compared with the year of 1998-1999. This may be due to more awareness about vehicle emission and household usage of LPG instead of fire wood, and solar water heater etc. In industrial area the SPM content was reduced by 55% during the year of 2008-2009 when compared with the year of 1998-1999. The increase of air quality in respect of SPM may be due to compliance of air pollution act by the industries as instructed by the SPCB and prompt installation and functioning of air pollution control measure like wet scrubbers and bag filters etc. There was an increase in SPM level by 71% during the year of 2008-2009 when compared with the year of 1998-1999. The increased SPM level may be due to increased vehicle population and man made activities etc. The mixed residential an improvement in air quality in respect of SO_2 & NO_x is observed during the year of 2008-2009 on comparison with year of 2008-2009. This may be due to increased tree growth and stoppage of burning of domestic wastes at road side. Industrial area decrease in SO_2 & NO_x level may be due to switch over of fuel by industries viz furnace oil to LPG, coal to electrical induction etc.

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ANTIMICROBIAL PROPERTIES OF SILVER NANOPARTICLES BIOSYNTHESIZED FROM AN INDIAN MEDICINAL PLANT

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High toxicity of silver nanoparticles on bacteria has resulted in extensive biological, biomedical and pharmaceutical applications of nanoparticles exhibiting antibacterial properties, including widespread products where bacterial growth should be inhibited. Common synthetic methods of silver nanomaterials include chemical reduction, photochemical method, ultrasonic-assisted reduction, electrochemical method, irradiating reduction, biochemical method etc. The development of reliable processes for the synthesis of silver nanomaterials is an important aspect of current nanotechnology research. Recently, cell-associated biosynthesis of silver nanoparticles using microorganisms have been reported, but these methods of synthesis are rather slow. This paper presents our work on rapid synthesis of silver nanoparticles by reduction of aqueous Ag^+ ion using *Azadirachta Indica* (neem) leaf extract. A detailed study on the synergistic effects of the antimicrobial properties of neem extract and the biosynthesized nanoparticles is reported here.

HOMOCYSTEINE LEVELS ARE ASSOCIATED WITH CERVICAL CANCER INDEPENDENT OF METHYLENE TETRAHYDROFOLATE REDUCTASE GENE (MTHFR) POLYMORPHISMS IN INDIAN POPULATION

SHOWKET HUSSAIN^{1*}, NISHA THAKUR¹, BHUDEV C DAS², SHANTANU SENGUPTA³ AND MAUSUMI BHARADWAJ¹

Human papillomavirus is considered to be a major etiological factor but is not sufficient for development of cervical cancer. Other host factors including altered homocysteine levels, a functional marker of folate inadequacy, might contribute to the carcinogenic process. Herein we investigated the potential association of homocysteine levels and *MTHFR* polymorphisms with cervical cancer in 203 histologically confirmed cases including 39 precancer cases and 231 healthy controls with normal cervical cytology. Both patients and controls were screened for Human Papillomavirus infection. We found that homocysteine and consequently cysteine levels were significantly higher in cases-both cancer and precancer ($p < 0.001$) than controls. However, polymorphisms in *MTHFR* gene (677 C/T and 1298 A/C) that are reported to modulate homocysteine levels were not associated with disease. Thus, our study establishes an association of total homocysteine levels with the risk of developing carcinoma of the uterine cervix.

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GENERAL PATHOBIOCHEMICAL REACTIONS IN PERSONS WHO WORK IN DIFFERENT HARMFUL INDUSTRIES

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Objective: To evaluate in comparison manner the activity of the lipid peroxidation in persons who work in different harmful industries.

Materials and methods: There were studied 366 workers of general group, in which there are men at the age of 47.4 ± 2.3 years with the length of work in harmful conditions at least about 10 years. Among them 156 persons work in production of primary aluminium, 143 contact with local vibration, and 67 – non-organic compounds of fluorine. Control group consists of 237 men of the same age without harmful factors at work. In this group it were evaluated malonic dialdehyde level (MDL) with thiobarbituric acid, activity of peroxidase (P) in test with indigo carmine and catalase (K) in reaction with ammonium molybdate.

Results: Studies showed the elevated level of MDL in long standing workers of 5.96 ± 0.7 , 6.34 ± 0.46 mμ/L regardless to harmful occupational factor which was accurately ($p < 0.05-0.01$) differentiated from data in control group (3.92 ± 0.66 mμ/L). In addition it was noted the decreased activity of enzymatic components of antioxidative defense of blood on P ($5.2 \pm 0.42-5.9 \pm 0.3$ microcat/L) as well as on K ($13.4 \pm 4.4-15.6 \pm 3.8$ microcat/L). In control group these data were accurately higher ($p < 0.05-0.01$) and evaluated as 6.7 ± 0.17 microcat/L and 28.2 ± 5.3 microcat/L respectively. Medical-preventing events including admission of multivitamins, disaggregation and physiotherapeutic procedures (laser irradiation, geomagnetic field and impulse current) result to decreasing of the MDL level and increasing of the activity of P and K. Conclusion: The results of the studies of persons who work in different harmful industries show that there are general pathobiochemical alterations, i.e. imbalance of processes of lipid peroxidation, activation of these reactions and significant decrease of antioxidative capacity of blood. Medical preventing procedures result to optimization of processes of lipid peroxidation.

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URBAN ENVIRONMENTAL RESOURCES MAPPING USING HIGH RESOLUTION SATELLITE DATA

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This Paper describes the studies conducted on the Environmental resources mapping by Using high resolution satellite data, as a part of community development by using present state of the art technologies like remote sensing and GIS. Increased emphasis on reducing global warming and compliance to reduction of green house gases has necessitated this investigation as a data provider for the Government agencies in their immediate environmental planning and management. This present study at micro level can be extended to macro level encompassing the entire state. Thus making a distinct improvement in the quality of life of the communities. This is achieved by studying the environmental factors like air quality, water quality (ground water), green cover, noise levels and land use patterns. For the study under scrutiny wards comprising of Gokula, Mathikere, and Yeswantpur has been identified. The environmental parameters, land use patterns are identified, checked analyzed and documented as attributes to GIS layers created, which has been enabled through high resolution remote sensed satellite data.

Keywords: Environmental planning, Resource Mapping, Satellite data, GIS

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HEALTH EFFECTS OF AIR POLLUTION IN MUMBAI: IMPLICATIONS FOR PUBLIC HEALTH POLICY

ARCHANA PATANKAR

Mumbai, one of the largest mega cities in the world, has been experiencing acute air pollution on account of population growth, industrial and commercial activity, construction boom and increasing vehicular traffic. Examining the health effects of air pollution in Mumbai is, therefore, necessary from the point of view of public health, productivity and better quality of life for its residents. This study was undertaken to investigate the link between air pollution and morbidity impacts for Mumbai and estimate their monetary burden. For this purpose, cross-sectional data collected by the Environmental Pollution Research Centre (EPRC) at King Edward Memorial (KEM) Hospital in Mumbai was used. Information on monetary costs of illness was obtained through the household survey and interviews with medical practitioners carried out by the researcher. Logistic regression was applied to the EPRC dataset to examine the relationship between air pollution and respiratory and cardiovascular symptoms and diseases. The monetary burden of the health impacts was estimated by using the cost of illness approach. Results indicate that particulate Matter (PM_{10}) and Nitrogen Oxides (NO_x) are critical pollutants for respiratory symptoms and diseases in Mumbai. The cost estimates developed in the study show the massive monetary burden of INR 4522.96 million and INR 8723.59 million on account of increases in PM_{10} and NO_x respectively. A substantial part of this monetary burden comprises out-of-pocket expenses of the residents. The findings of this empirical study have implications for public health policies and programmes in Mumbai, particularly from the perspective of the accessibility and affordability of healthcare to poor households living in its slums.

NANOTECHNOLOGY – A BRIEF INTRODUCTION, WITH OCCUPATIONAL AND ENVIRONMENTAL CONCERNS

ADITHYA P

Nanotechnology is a science on the rise. Research and applications in this field will soon become a trillion dollar industry. There are several potential applications especially for the fields of medicine. Yet as products containing manufactured nanoparticles enter the market, there is little known on the health and environmental impacts of these particles. Methods to tackle nanowaste are also inadequately researched. Learning from past experiences of biotechnology and nuclear power, appropriate testing of nanotechnology before release into the market seems essential to say the least. This paper covers a broad range of topics including background information on the basics and definitions of the science of nanotechnology, the applications of nanotechnology in medicine and other fields, the raw materials used, generation of nanoparticles in the natural environment and at workplace, occupational exposures, measurement of exposure and exposure mitigation, consumer and environmental exposures, health effects from exposures to nanoparticles, disposal options and recommendations available and issues of regulation of the nanotechnology industry. The paper aims to do two things: introduce the science and the issues of nanotechnology to the health research community and also to initiate further discussion in this regard from experts.

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DEGRADATION OF TEXTILE DYES USING MICROBIAL ISOLATES

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Synthetic dyes which often contain substitutions such as azo, nitro and sulfo groups are recalcitrant to microbial degradation. Sulfonated azo dyes are produced in vast quantities and are mainly used in textile dyeing. They are considered to be xenobiotics, since aromatic, azo and sulfo groups are not synthesized in the biosphere and hence are recalcitrant to oxidative biodegradation. However bacteria, actinomycetes and fungi are found to degrade azo, heterocyclic, and polymeric dyes. The effluent of the textile and dyestuff industries has to be treated by physical process which may be expensive. Biodegradation of dyes is gaining importance, as chemical treatment is further contributing to pollution problems. It is a well known fact that micro-organisms found in the natural habitat constantly exposed to these pollutants are exploited for biodegradation studies. As a result, isolation and screening of local isolates of micro organisms capable of degradation becomes imperative. In the light of the above facts, fungi degrading dyes in aerobic environments were isolated from soil. The study dealt with the isolation of fungi from soil and screening for dye degrading ability. The isolated species, selected for further studies were identified. Four commercially important textile dyes were used for degradation studies namely, Cold Brand Procion Turquoise - MGN, Hot brand Procion Turquoise - HEG, Hot Brand Procion Brilliant Red - HE7B and Cold brand Procion Magenta - MB. The percentage of decolorization of the dyes by fungal cultures in Nitrogen limited media under still and shake conditions were studied.

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***In vitro* GENOTOXICITY TESTING OF ZINC OXIDE NANO PARTICLES SYNTHESISED BY SIMPLE HYDROTHERMAL PROCESS**

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Recently, extensive research has been devoted to fabricate various kinds of nanostructures, among various metal oxides semiconductor nanostructures, Zinc oxide (ZnO) has been identified as a richest member of the family of nanostructures.

In the present work, ZnO nanoparticles were synthesized by a hydrothermal method between anhydrous Zinc acetate and sodium hydroxide in the absence of surfactant and template at relatively low temperature. X- ray diffraction studies (XRD) revealed that the ZnO nanoparticles were crystalline with preferential orientation. Scanning electron microscopy image revealed that the ZnO particles had a diameter ranging between 75 - 100nm.

The synthesized ZnO particles were tested for genotoxicity in human lymphocytes cultures. ZnO particles in the concentration of $10^{-3}\mu\text{g/ml}$ was added to 24 hours old human lymphocyte cultures and further incubated for 48 hours. The cultures were harvested and observed for aberrations. Cultures without nanoparticles were maintained to serve as control. A significant degree of chromosomal aberrations were observed in lymphocytes exposed to ZnO particles indicating the genotoxic nature of the synthesized nanoparticles. However further studies would validate the genotoxic potential of ZnO particles in other cellular systems.

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ENTOMOTOXIC ACTION OF FUNGAL METABOLITES AND ITS PROSPECTS FOR MOSQUITO CONTROL

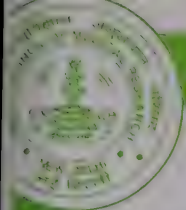
SUKIRTHA. T. H¹ AND GURUSUBRAMANIAN²

Mosquito borne diseases such as malaria, filariasis, Japanese encephalitis, dengue, hemorrhagic fever and yellow fever remain the leading causes of morbidity and mortality in developing countries. Mosquito control is a difficult task due to a variety of factors including the concern over environmental pollution. While it is likely that chemical insecticides will continue to be required for mosquito control, especially for the suppression of diseases such as malaria and filariasis increased emphasis is being placed on the development of alternative tools of control for use in integrated mosquito control programmes.

In this study, the derived extract from culture filtrates of different entomopathogenic fungi (*Aspergillus niger*, *Fusarium spp*, *Trichoderma viride* and *Rhizopus aurhizus*) have been used to detect the larvicidal potency against 3 mosquitoes (*Anopheles stephensi*, *Culex quinquefasciatus* and *Aedes aegypti*) larvae was increased two fold than that reported earlier while the toxicity of the metabolites from *Fusarium spp*. was reduced two fold. A decrease in percentage of pupal and adult emergence and lesser time taken for 100% larval mortality was noticed in all the chosen concentrations of culture of entomopathogenic fungi with reference to *Anopheles stephensi*, *Culex quinquefasciatus* and *Aedes aegypti*.

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A SOCIO-ENVIRONMENTAL CONTEXT OF INTRODUCING IMPROVE COOKING STOVE IN THE HILLY AREAS OF BANGLADESH

MD. PARVEZ RANA, MD. SHAWKAT ISLAM SOHEL, SAYMA AKHTER

A study was conducted to figure out the socio - economic and environmental consequences of biomass fuel usage in the traditional and improve cooking stove. Specifically, the study examined whether improved cooking stove users were more involved in fuelwood collection and consumption in the study area than users of traditional stoves. The introduction of improved cooking minimizes people's forest dependence by reducing the amount of fuelwood required to meet their household needs. The study observed that among improve cooking stove users, 79% of households said they consume approximately 3 kg fuelwood per day, in contrast, 74% of the traditional cooking stove users said they consume about 10 kg of fuelwood. Firewood was the most frequently used biomass fuel by the respondents - contributing around 63% of total annual consumption. The main source of biomass fuel was reserve forests (55%). It has been figured out that the incomplete combustion of biomass in the traditional cooking stove poses severe epidemiological consequences to human health and contributes to global warming. While improve cooking stove help to reduce this consequences. The study also showed that 83% of the respondents would prefer improved cooking stoves over traditional cooking stoves.

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LEVELS OF PLASMA BUTYRYLCHOLINESTERASE ACTIVITY AMONG SELECT SPECIES OF BIRDS IN AHMEDABAD, INDIA

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Inhibition of plasma butyrylcholinesterase (BChE) activity is widely used as a biomarker to assess exposure to organophosphorus and carbamate pesticides in birds. Determination of the degree to which ChE activity has been inhibited requires good base-line knowledge of normal (control) activity levels. However, there are difficulties in defining control activity levels. Large-scale variation makes it difficult to identify when pesticide-mediated inhibition of activity occurs. In the present study, we evaluated the levels of BChE activity in plasma samples of six species of birds, namely Blue Rock Pigeon, Painted Stork, Pariah Kite, Sarus Crane, Sparrow Hawk and White-backed Vulture collected from Ahmedabad as a part of a project assessing the impact of environmental contaminants on birds in India. During January 2005 and January 2006, about 55 plasma samples comprising six species of birds were collected in Ahmedabad. BChE activity was measured in UV-Vis Spectrometer at 406 nm using specific substrate and inhibitor. BChE levels in plasma samples ranged between 0.53 $\mu\text{moles/min/ml}$ and 2.223 $\mu\text{moles/min/ml}$ in Blue Rock Pigeon and Sparrow Hawk respectively. Significantly high BChE activity was recorded in Sparrow Hawk, while it was low in Pariah Kite. The variation in plasma BChE activity among the various species of birds is significant. The BChE activity documented in these species could be considered as reference levels.

Keywords: Birds, Plasma, Reference level, Butyrylcholinesterase

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HEAVY METAL CONTAMINATION IN SELECT FRUITS AND VEGETABLES AVAILABLE IN COIMBATORE MARKET, TAMIL NADU, INDIA

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Fruits and vegetables offer the most rapid and cost effective source of vitamins, fibers and minerals to humans. Nutrients such as Cu, Zn, and Mn essential for human do become toxic at higher concentrations. Nearly half of the mean ingestion of metals such as lead, cadmium and mercury through food is of plant origin (fruit, vegetables and cereals). Thus, metal accumulation in fruits and vegetables may pose greater threat to human health. Levels of heavy metals, namely Cu, Zn, Pb, Cd and Cr in five select common vegetables (Lady's finger, Cabbage, Radish, Palak and Amaranthus) and fruits (Apple, Pineapple, Orange, Grapes and Banana (Poovan and Morris) available in Coimbatore market were measured during January and February 2008 on fortnightly basis. Standard perating protocols were followed in processing (Microwave assisted digestion) and analyzing (Atomic Absorption Spectrometer) for heavy metals. Among the vegetables, Palak accumulated the highest levels of Cd (0.30 ± 0.02 ppm) and Cu (15.40 ± 0.01 ppm) while Amaranthus had the highest load of Pb (2.32 ± 0.024 ppm), Zn (38.44 ± 2.08 ppm) and Cr (2.65 ± 0.19 ppm). Among the fruits studied, on an average, Cd was more in Orange (0.19 ± 0.02 ppm), Pb (1.69 ± 0.25 ppm) and Cu in Morris (14.35 ± 0.65 ppm), Cr in Poovan (2.53 ± 0.02 ppm) and Zn in Pineapple (12.20 ± 0.67 ppm). The recorded levels are found to be comparatively lower than the levels reported elsewhere. Further, the significant variation ($P < 0.05$) noticed among the vegetables and fruits in contamination levels could be due to the variation in uptake and distribution of metals from the soil to different parts. Some samples of Palak and Amaranthus exceeded the IPFA, 1954 limits for lead (2.5 ppm) and Zn (50 ppm). However, presuming that a person consumes 200g of vegetables and fruits in his daily meal, the levels recorded in the present study, both in vegetables and fruits, appear to be within the safe limits prescribed by various statutory agencies for human consumption.

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CYTOPROTECTIVE EFFECT OF *GYMNEMA MONTANUM* H. AGAINST OXIDATIVE STRESS MEDIATED CYTOTOXICITY AND DNA DAMAGE IN HUMAN PROMYELOCYTIC LEUKEMIA CELL LINE HL-60 CELLS

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Gymnema montanum H. (Hooker, 1883) belongs to the family Asclepiadaceae is an endemic plant species found mainly in Western Ghats, India and traditionally used to treat disorders such as diabetes, wounds, inflammation and gastrointestinal ailments. This study was conducted to evaluate the cytoprotective efficacy of *G. montanum* against the oxidative stress induced by H₂O₂ and alloxan in HL-60 cells. The pre-treatment of the cells with the ethanol extract of *G. montanum* leaves (GLEt) resulted in significant protection against H₂O₂ and alloxan induced cytotoxicity. GLEt pretreatment also reduced the proportion of apoptotic death induced by H₂O₂ and alloxan, which was demonstrated by the decreased percentage of sub-G1 cell population and annexin-V positive cells. GLEt treatment increased the activities of cellular antioxidant enzymes superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GPx) and glutathione-s-transferase (GST), and decreased lipid peroxidation in oxidative stress induced HL-60 cells. Further, the protective efficiency of GLEt against oxidative DNA damage was studied by alkaline comet assay. The results showed that GLEt treatment effectively protected the cells from H₂O₂ and alloxan induced oxidative DNA damage in dose dependent manner. GC-MS analyses of GLEt revealed the presence of phenolic antioxidant compounds such as Carvacrol, Erythritol, Gallic acid, and Quercetin. These results suggest that *G. montanum* may be a candidate for therapeutic or preventing use against oxidative stress associated disorders.

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GENOTOXICITY OF ZnO NANOMATERIALS IN HUMAN PERIPHERAL BLOOD LYMPHOCYTES

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With the recent development in nanoscience and nanotechnology, there is an extreme demand for assessment of the potential hazards of nanomaterials to humans and other biological systems. ZnO nanomaterials exhibit different biological activities and different toxicities in relation to their physicochemical characteristics, size, shape, crystallinity and presence of metal traces. Due to the limited background of genotoxicity studies and the increased occupational and public exposure to ZnO nanomaterials, the present study was aimed to assess the potential genotoxic effects of ZnO nanomaterials with respect to their size and shape. In this study we have used a well characterised ZnO nanomaterials such as microparticles (MP), microrods (MR), nanorods (NR), and nanoparticles (NP). The cytotoxicity of the test materials were studied at 6 different dose levels (50-2000 ng/ml) using the trypan blue exclusion assay and genotoxicity was assessed by the single cell gel electrophoresis (comet) assay in human peripheral blood lymphocytes. In the comet assay, all forms of ZnO nanomaterials induced a dose-dependent increase in DNA damage as measured by number of tailed cells (in %), total comet length and length to width ratio of the comet, at all treatment times, with a statistically significant effect starting at the lowest dose tested. The cytotoxicity of micromaterials was found to be more when compared with the nanomaterials whereas their genotoxicity was less than that of nanomaterials. Among the nanomaterials tested, nanoparticles recorded higher genotoxicity than nanorods. In conclusion, our results suggest that both forms of ZnO nanomaterials are genotoxic in human peripheral blood lymphocytes in vitro. The difference in the levels of toxicity may be due to the smaller size of the particle, which makes them easily penetrate across the cell membrane by diffusion and reach nucleus and induced more DNA damage.

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OCCUPATIONAL STRESSORS AND MUSCULO-SKELETAL DISORDERS AMONG WOMEN ENGAGED IN AGARBATTI ROLLING

ANJALI NAG, RACHNA SHAH, AND VINITA VERMA

The manufacturing of Agarbatti (incense sticks) is an informal sector of industry widespread throughout the country, dominated by women workers. A study was undertaken to examine the prevalence of musculo-skeletal disorders (MSDs) and its association with dimensions of work stressors (work aspects). A multi-method ergonomics checklists (mechanistic, biological, environmental, perceptual and motor, technical and psychosocial aspects of work) was implemented among the women workers (N=150), to have a thorough understanding of the interaction of the tasks with workers, the work method and tools involved in job operation, workplace and working condition. The pain and discomfort of the women were recorded using OSHA questionnaire. There was high prevalence of musculo-skeletal pain and discomfort among these women (age ranging from 18-55 yrs). The lower back (75%) was the most affected area followed by the upper back (33%), hand (31%), Knee (29%) and ankle (21%). The results showed that 20% of women had severe pain episode, which could only be controlled by medicine. The opinion of the 57% workers regarding the predisposing factor for pain was associated with the method of work and sustained sitting work posture. Age >25 years (OR 3.4) and marital status (being married, OR 4.2) had influence on the occurrence of MSDs. Correlation matrix explained that incompatible work place ($p<0.05$), hot environment ($p<0.01$), poor job autonomy ($p<0.01$), poor task clarity ($p<0.05$) and poor job significance ($p<0.05$) had significant impact on the occurrence of MSDs. The risk potential of MSD among women agarbatti rollers is a culmination of multiple adverse influences, such as methods of work, working conditions and environmental stressors.

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PULMONARY EFFECTS OF OCCUPATIONAL EXPOSURE TO WELDING FUMES

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This article presents the results of a cross-sectional study in a randomly selected factory performing welding operation in Iran to determine the respiratory symptoms, pulmonary function and x-ray changes in the employees. Through this study, the data obtained from 160 mild steel (MS) welders and 86 healthy volunteers were statically analyzed. Two groups of workers were matched according to their age, height, smoking habit and years of service. Their health survey was evaluated by questionnaire, spirometry, chest x-ray and clinical evaluation. In addition, welding fumes were determined by Atomic absorption and X-ray fluorescence method. Concentrations of personal breathing zone and Arc welding fumes were 7.13 mg/m³ and 17.49 mg/m³, respectively, that showed high concentration compared to the Threshold Limit Value-Time Weighted Average (TLV-TWA). After adjustment for tobacco habits, the welders presented a higher prevalence of bronchial irrelative symptoms such as cough, phlegm, dyspnea, and wheezing than the controls ($p=0.05$). These results indicate that smoking potentates the effect of welding fumes on chronic bronchitis. The ventilatory functions (VC, FVC, FEV₁, and MMEF) were significantly lower in the welders compared with controls ($P=0.05$). Lung functions in non-smoking welders were impaired and a significant tobacco effect was not found. Also Chest X-ray abnormalities were higher in welders (13.8%) than the control group (2.5%). The results of multiple regression indicated that age and height were not a confounding factor. Occupational health program to reduce the total fumes exposure, and periodical medical examination are measures to prevent lung disease.

Key words: welding fume; respiratory symptoms; pulmonary function; occupational exposure; Iran.

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IMMUNE RESPONSE TO HEPATITIS B VACCINE IN WNIN MUTANT OBESE RAT MODE

PRATHIBHA. B, R. HEMALATHA AND N.V. GIRIDHARAN

Obesity is a metabolic syndrome leading to degenerative diseases, and clinical and epidemiological data indicate impairment in immunity in obese individuals as well. Though human studies showed poor antibody response to vaccination, lymphocyte and macrophage functions under similar situation have not been reported so far. At our institute we have two obese mutant rat strains namely WNIN/Ob and WNIN/Gr-Ob. While the former is eulyceremic, the latter shows impairment in glucose tolerance. These animals develop opportunistic infections and tumors as they cross one year of age and their life span is reduced to 1 1/2 years suggesting impairment of immune response. In the present study hepatitis B vaccine was administered intramuscularly to 3 months old female animals of both the strains and Hepatitis B surface antigen (HBsAg) specific IgG response, splenic lymphocyte proliferative response to concavalin A and HBsAg and nitric oxide (NO) production by peritoneal macrophages were examined. It was observed that the HBsAg specific IgG response was significantly low in obese vaccinated compared to lean in both the strains. Though the splenic lymphocyte proliferative response to concavalin A was comparable between obese and lean naïve animals in both the strains, the proliferative response to HBsAg was low in obese vaccinated compared to lean vaccinated. The basal and lipopolysaccharide induced NO produced by peritoneal macrophages were comparable between obese and lean naïve and vaccinated animals of WNIN/Ob whereas in WNIN/Gr-Ob the basal and lipopolysaccharide induced NO production was significantly higher in obese naïve animals compared to lean naïve animals. However, upon vaccination NO production was higher in WNIN/Gr-Ob lean vaccinated only but not in obese vaccinated. All these results clearly show impairment of protective immunity and immunological memory under obese conditions.

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CHRONIC VITAMIN B12 AND OR / FOLATE RESTRICTION ALTERS BODY COMPOSITION, PLASMA LIPID PROFILE IN WISTAR FEMALE RATS AND BIRTH & WEANING WEIGHTS IN THEIR OFFSPRING

KALLE ANAND KUMAR, LALITHA.A, RAGHUNATH.M

Maternal vitamin deficiencies are associated with low birth weight and increased rate of perinatal morbidity and mortality. To study the effect of vitamin B12 and or/ folate deficiency per se on body composition, lipid profile and glucose tolerance in wistar female rat and the effect of maternal deficiency on the body weight of their offspring. The weanling Wistar female rats were fed for three months a control (AIN 76 A) diet (n=18), or the same diet restricted in folate (n=18), or vitamin B12 (n=30) and combined restriction (N=18). Their body composition, oral glucose tolerance, plasma insulin response and plasma lipid profile were determined. Control, folate, & combined restriction rats (each n=12) respectively and 24 rats from B12 restricted were kept mated while the remaining rats were remain same for another three months. 6 pregnant B12 restricted rats were rehabilitated with control diet from conception and parturition respectively. Birth and weaning weights of offspring were determined. Chronic B12 restriction for three months significantly increased body weight, body fat % and decreased lean body mass %, fat free mass % and by 6 months in other restrictions. A significant increase in adiposity Index was observed associated with dyslipidemia. None of the treatments affected fasting glucose, HOMA IR or glucose stimulated insulin response. B12 restricted offspring had significant low birth weight while weaning weights of all restricted groups were higher than controls. B12 rehabilitation regimes could correct the birth and weaning weights of the offspring. The studied vitamins long term restriction may lead to the development of insulin resistance in rats.

MENSTRUAL PATTERN AMONG GIRLS IN MYSORE

SHABNAM OMIDVAR, KHYRUNNISA BEGUM

Menstruation is a phenomenon unique to females and nearly universal experience in women's lives, yet it is rarely explicitly talked about, and women experiences of menstruation remain poorly understood. About 194 girl students aged 18-27 years were selected and asked to complete anonymous questionnaires for obtaining data regarding demographic features, menarche age, menstrual pattern, severity of dysmenorrhea and associated symptoms, impact of menstrual pain on working ability, the source of their knowledge about menarche and menstruation. The mean age of the subjects at menarche was 13.36 ± 1.25 years with a range of 10-17 years. Mean of duration of menstrual flow was 4.77 ± 1.06 days. The most prevalent menstrual symptoms were tiredness (47.9%), backache (38.3%) and anger (34.5%). Prevalence of irregularity and dysmenorrhea was 11.9% and 78.2%. 6.7% of them had severe dysmenorrhea. 76.6% of the dysmenorrheic girls reported that their working ability was affected. 60.4% of the girls were aware of menstruation prior to menarche. Mothers and friends were the main source of information (47.8%). In conclusion, prevalence of dysmenorrhea and menstrual irregularity among young females is high. Moreover, their working ability is affected by menstrual pain. A comprehensive school education program on menarche, menstrual problems, is needed.

Keywords: Menstrual pattern, Menarche age, dysmenorrhea

ROLE OF OXYGEN FREE RADICALS IN CHLOROQUINE INDUCED DOSE SPECIFIC HEPATOTOXICITY IN MICE MODEL

SHRAWAN KUMAR MISHRA, PRABHAT SINGH, AJEET KUMAR VERMA, SRIKANTA KUMAR RATH

Chloroquine (CQ) a well known antimalarial drug induces hepatotoxicity and oxidative stress. Present study evaluates the mechanism of CQ hepatotoxicity and its protection by quercetin a plant based flavonoid in mice model. 20-25 g Swiss albino mice were dosed with different amount of CQ ranging from human therapeutic equivalent of 360 mg/kg body wt. to as high as 2000 mg/kg body wt. Serum alanine amino transferase (ALT), aspartate amino transferase (AST) levels and reactive oxygen species (ROS) generation was estimated.. Quantitative Real time PCR was then performed to evaluate differential gene expression of antioxidant enzymes. Significant generation of ROS, elevation in the levels of serum ALT, AST, tissue LPO followed with reduction in the level of reduced GSH content, decrease in the antioxidant enzyme activity and their mRNA expression was observed in 2000mg/kgCQ dose whereas therapeutic equivalent dose did not show any appreciable change from that of untreated control mice. Quercetin (50mg/Kg body wt.) pretreatment in 2000mg/Kg body wt. CQ dosed group did not show hepatotoxic response or oxidative stress and activities as well as mRNA expression of both enzymatic and non-enzymatic antioxidants were near to normal. High concordance in the mRNA transcript level and enzymatic activity of antioxidant enzymes observed in the study indicates that oxidative stress is active at reducing the mRNA transcript of major antioxidant enzymes eventually resulting in their loss of enzyme activity. The results obtained clearly indicate that chloroquine is safer at its therapeutic equivalent dose albeit its higher dosages are hepatotoxic and generates free radical induced oxidative stress. The study further suggests a protective role of quercetin in amelioration of CQ induced oxidative stress and hepatotoxicity.

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ENVIRONMENTAL MONITORING AROUND URANIUM MINING AND ORE PROCESSING FACILITY, JADUGUDA, JHARKHAND

SETHY N.K., V.N. JHA, A.K. SHUKLA, R.M. TRIPATHI AND V.D. PURANIK

In nuclear industry environment is given due importance by setting up Environmental Survey Laboratories in the vicinity of each nuclear installations. Uranium mining and ore processing started in India about four decades ago in the east Singhbhum area of Jharkhand. The existing ore processing technology is based on leaching of the crushed ore using sulphuric acid, pyrolysis oxidant followed by ion-exchange separation and product recovery in the form of Magnesium Urenate. Large quantity of waste generated is neutralized using lime, separated into coarse and fines the latter fraction discharged into the tailings pond. Like any other conventional industry uranium mining and ore processing has a safe way of disposing the waste in an engineered impoundment system popularly known as tailings pond (TP). 'Tailings' is the waste generated from the process plant after recovery of economically viable portion of the ore. It contains dissolved radionuclide (U(nat), ^{226}Ra , ^{230}Th , ^{210}Po etc) of uranium series and chemical pollutants like Mn, SO_4^{2-} , Cl⁻ etc. required for the recovery of the final product. Stringent control measures are taken for the safe disposal of radioactive waste from the mining and processing of uranium ore. Since some of the radionuclide of concern are quite long lived it is ensured that the disposal will not significantly change the preexisting radiological environment of the surrounding areas.

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PREDICTION OF RISK FACTOR IN BREAST CANCER USING ID3 ALGORITHM AND ASSOCIATION RULE INTEGRATING GIS WITH FUZZY LOGIC IN MATLAB ENVIRONMENT

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AND BALASUBRAMANIAN S¹

The objective of this paper is to find the area of breast cancer risk based on stages using ID3 and Association rule and to determine the range of the risk of breast cancer using Fuzzy Logic with MATLAB 7.0. The intensity of breast cancer in different taluks such as Coimbatore north, Coimbatore south, Pollachi, etc., based on cancer stages are measured and mapped using data mining technique ID3 algorithm and compared with the Association rule. ID3 algorithm is used to find the decision making data field among 17 data fields of 181 cancer cases. For data field 'cancer stage' with a data field 'Taluk', ID3 algorithm shows two places of intensity compared to 20 places of intensity as shown by association rule. Fuzzy logic used on decision making field such as stage from ID3 algorithm, which constitute of tumor size, lymph node and metastases, using MATLAB 7.0. This provides information to the user about the intensity of the risk of breast cancer therefore mobilizing the awareness programme much better.

Keywords: ID3, Association Rule, Fuzzy logic and Breast Cancer Stage.

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RESPIRATORY PROBLEMS AMONG THE LABORERS WORKING IN THE CEMENT WAREHOUSES - A PRELIMINARY STUDY.

HUGAR S H, KUMAR SA, NAVEEN K H, ASHOK N C

Background: Laborers working in the cement warehouses are exposed to the cement dust and are at an increased risk of respiratory diseases. Objective: To study the respiratory problems among the laborers working in the cement warehouses. Study design: A cross sectional community based study. Study area: Cement warehouses situated near the JSS Medical College, Mysore. Study subjects: All the workers working in these cement warehouses. Methodology: All the laborers working in the cement warehouses are registered with the "Loaders and Un loaders Association". The purpose of the study had been discussed with the president and other members of the association and their co operation sought. During the study informed consent will be taken by explaining the objective of the study to the subjects. A pilot study was done using a pre designed proforma and appropriate changes have been made based on the findings. The study subjects will be interviewed and examined using this pre designed and pre tested proforma. The subjects will be classified as having chronic cough, chronic sputum production, dyspnoea, wheeze, work related shortness of breath or chronic bronchitis based on the British Medical Research Council questionnaire for the respiratory symptoms. Data on the sociodemographic profile, duration of exposure to the dust, smoking habits will also be collected. Lung function tests will be done using a spirometer. The data collected will be tabulated and analysed using SPSS 12.0 software. The results of the study will be communicated to the subjects and the key stake holders. They will be persuaded to take up the appropriate steps to reduce the exposure to the dust.

Y-CHROMOSOME ASSOCIATED MALE STERILITY AND ITS ASSOCIATION WITH ENVIRONMENTAL FACTORS

ABILASH, VG¹, RADHA SARASWATHY¹ AND MARIMUTHU KM²

Male sterility is a medical condition characterized by an inability to fertilize an ovum. There are a number of reasons for men to be infertile, and several treatment approaches can be used to address sterility in men. The aetiology may be either congenital or acquired. Spermatogenesis is also very susceptible to the environment. Therefore male infertility is a complex and very heterogeneous trait. Environmental factors, drugs, lifestyle and occupation also contribute to male sterility. The genetic causes of male infertility remain fragmentary and inconclusive for want of a single study collaborating several facets of genetic and molecular aspects. Lately with the application of sophisticated DNA analyzing technology a more clear insight into the genetic causes of male sterility was made possible. Many genes have been identified on the Y chromosome each of which may contribute to male infertility. Y chromosome deletions are facilitated by a combination of organization of Y chromosome genomic sequences and by environmental influences. Hence our main objective is to make such a collaborative study in well-established male sterility genetic disorders. In the present study a comprehensive analysis was made of pedigrees in all the patients, cytogenetic and molecular studies and environmental factors with 64 diagnosed male infertility cases. Out of 64 infertile cases, 24 were azoospermic and 40 were oligospermic cases. The genetic causes of infertility in 35 smokers, 15 Alcoholics, 14 exposed to industrial chemicals were analysed. A correlation analysis of the results obtained from pedigree analysis, cytogenetic, molecular and environmental factors were evaluated.

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STUDIES ON THE BIOACCUMULATION OF HEAVY METALS BY *HAEMANTHUS SPECIE* AND *MITRACARPUS SCABER* AND THEIR POSSIBLE USE AS PHYTOREMEDIATORS

KIYAWA S. A

This study assessed and monitored the concentrations of Cu, Mn, Zn, Fe, Co, Cr, Ni and Pb from 2006 to 2008 in *H. specie* and *M. scaber* from Northern Nigeria. Levels of heavy metal concentrations in the two plants were determined using atomic absorption spectrophotometer. Descriptive statistical analysis has shown a mean value of 4.78 and 2.56, a standard deviation of 4.95 and 3.29 and a range of 17.35, 10.72 for *H. specie* and *M. scaber*. The value of Average concentration factor were 10.65, 3.06 and 2.67 $\mu\text{g/g}$ of Co, Fe and Cu for *M. scaber* and 15.83, 4.62, 3.25, 5.43 and 3.14 $\mu\text{g/g}$ for Ni, Cr, Cu, Co and Mn for *M. scaber*. When compared altogether, Ni is the most bioaccumulated metal between the two plants and then Co, and Pb being the least. They are hence endemic indicator plant species with potential for use in bioaccumulation, phytoremediation / phytoextraction. Kendall's tau analysis shows no significant correlation ($p>0.05$) between plants and year, elements and year, and plant and plant in the different treatments.

Keywords: Heavy metals, *Haemanthus specie*, *Mitracarpus scaber*, bioaccumulation, Phytoremediation

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ANAMOLOUS ZONES OF WATER QUALITY PARAMETERS IN HOSKOTE TALUK, BANGALORE RURAL DISTRICT, KARNATAKA, INDIA

SHANKAR B.S¹, MARUTHESHA REDDY M.T² AND BALASUBRAMANYA N³

Water samples have been collected from eighty two different localities of the taluk for analysis and the analysis results have been used in the interpretation of its chemistry. Isoconcentration maps have been prepared and the anomalous zones have been marked using GIS techniques. Statistical parameters such as mean and standard deviation have been computerized and presented in this paper. Isoconcentration maps of calcium, nitrate, fluoride, iron and TDS have been marked. Their health effects and mitigative measures have been highlighted and explained in this paper.

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PESTICIDES EXPOSURE IN INDIA SCENE

SIVAPERUMAL. P¹, T.V. SANKAR², NIDHI, SINGH¹, ASHOK KUMAR¹ AND TEJAL¹

Pesticides are used to prevent, destroy, repel, attract, or reduce pest organism. Pesticide applications are different area viz., forestry, landscaping, agriculture and domestic use, but their residues often reach environment and transferred through phytoplankton to food chain and ultimately to humans. Pesticides are well recognized as an economic approach to controlling pests, at the same time such chemicals are highly toxic to other species sharing the environment. Now there is growing concern worldwide over the indiscriminate use of such chemicals that results in environmental pollution and toxicity risk to nontarget organisms. Chemical Pollution by pesticides has been increasing in a large scale due to their vast usage for eradication of various pests and insects and to protect agricultural crops. India is an agricultural country and second largest manufacturer of basic pesticides in Asia and ranks 12th globally. The worldwide consumption of pesticide is about two million tonnes per year, 24 % is consumed in the USA, 45% in Europe and 25% in the rest of the world. India's share just 3.75%. The usage of pesticides in India is only 0.5kg/ha, while in Japan and Korea; it is 12.0 kg/ha and 6.6kg/ha respectively. Pesticide in long-term, sub lethal exposure is linked with human health effects such as immune-suppression, hormone disruption, diminished intelligence, reproductive abnormalities, birth defects and cancer. The present article deals with trends and patterns of pesticide use, impact of pesticides on human health, factors contributing to pesticide risk, environmental impacts of pesticides and bioaccumulation of pesticide residues in food and giving special concern to the situation in India.

Keywords: Pesticides, Organochlorine pesticides, Organo phosphorus pesticides and Health effects.

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GENOTOXIC POTENCY OF THE COIMBATORE "RAIN WATER"

RAJESH KUMAR. M¹, M. LOGANATHAN¹, C. VIJAYANAD¹, T. ELAYARAJA¹, M. PALANIVEL¹,
P. RAJAGURU², K. KALAISELVI¹

In urban centers incineration of municipal solid wastes, combustion of fossil fuels such as oil and coal industries, automobiles and domestic burnings are the major sources of air pollution. In most of Indian cities, due to excessive urbanization and concentration of human activities, there are no clear boundaries for industrial, commercial, residential and sensitive zones. In all industrial cities the quality of air has been deteriorated in several pockets of the city. Air pollution caused due to both gases (NO_x , SO_x & CO_x) and particulates (Organic and inorganic). Air pollution can affect our health in many ways with both short and long term effects. The extent to which an individual is harmed by air pollution usually depends on the total exposure to the damaging chemicals i.e. the duration of exposure and the concentration of the chemicals. A wide range of health effects such as cancer, neurotoxicity, immunotoxicity and cardio toxicity leads to increased morbidity and mortality in population. As the toxic effects of air pollutants are well recognized in urban places. Determination of the type, concentration and genotoxic potency of the ambient air and the rain water of major cities is significant in air pollution studies. Rain water samples were collected from different parts of Coimbatore for a period of 6 months during the rainy season. The rain water samples were analysed for various physico-chemical parameters. The organic compounds were qualitatively analysed using GC- MS, extracted and studied for its genotoxic potency using single cell gel electrophoresis. The qualitative analysis showed that the rain water contains aromatic, aliphatic, heterocyclic and mercaptans. Though aromatic hydrocarbons are genotoxic the organic extracts of rain water collected from Coimbatore showed no significant DNA damage on human peripheral blood lymphocytes. Thus this study suggest for quantification of organic compounds present in the rain water.

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ASSESSMENT OF VEHICLE EMISSION AT TIRUPUR CITY

RAMASAMY. M¹, P. GOPALAKRISHNAN¹, M. KARTHIKEYAN¹, V. VEERAKUMAR¹,
K. BOOPATHY¹, C. VIJAYANAND¹, P. RAJAGURU², M. PALANIVEL¹, K. KALAISELVI¹

Tirupur is an important industrial city of South India and ranks seventh in the country population. Economically Tirupur is an important trade centre of India. Due to various industrial activities the human and the vehicular population increase day by day. Vehicular emission contribute 60% of total air pollutants to the atmosphere. The major vehicular pollutants are NO_x, SO_x, CO, hydro carbon and particulate matter. The present study aims to review and synthesize the existing knowledge on ultra fine particles in the air with a specific focus on those originating due to vehicle emission. The study was conducted in two different locations of Tirupur for a period of three months from January to March 2009. The vehicular emissions were collected with the help of vehicular monitoring centre located in Tirupur. Registrations of Vehicles were very high in the years of 2003 to 2006. Among the 49 vehicles, 16% are petrol powered engines in which CO and HC exceeds the permissible limit. The observation of the study shows most of the petrol powered engine vehicles exceeds its CO and HC emissions when compared to the emission standards. Hence measures have to be taken to reduce the load of CO and HC by reducing the on road vehicle by expanding roads, construction of fly over and subways.

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A STUDY ON MICRO METEOROLOGICAL PARAMETERS AT CHEYYUR OF KANCHIPURAM DISTRICT

VEERAKUMAR.V¹, M. RAMASAMY¹, P. GOPALAKRISHNAN¹, M. KARTHIKEYAN¹, K. BOOPATHY¹, C. VIJAYANAD¹, P. RAJAGURU², K. KALAISELVI¹, M. PALANIVEL¹

The meteorological parameters (wind speed, wind direction, temperature and humidity) playing the vital role in the atmospheric stability process. The amount of air dilute the pollutants is related to wind speed and the extent to which emission can rise to the atmosphere. This is an important factor to study the dispersion and dilution of emitted pollutants in the atmosphere. The aim of the present study is to collect the data on meteorological parameter of Cheyyur, Kanchipuram District, Tamil Nadu, India, and to assess the its capacity in dispersion and dilution of the pollutions without affecting the environment. The study was conducted for a period of one month from 27th January 2009 to 27th February 2009. In the present study the pressure levels were found to be fairly consistent over the study period. The average pressure observed to be in the range of 775-788mmHg. The air is generally humid. The average relative humidity was observed to be with maximum of 97% and minimum of 38%. Both day and night temperature varied over a time during the study period the range of temperature varied between 17-41.1. The most predominant direction is north west and the wind speed varied between 1-10Km/hr. In the recent time, the increasing air pollution levels in the atmospheric environment of urban centers causing serious problem on public health on human race. All these pollutants undergoing rapid changes in the atmospheric concentration as a result of increasing human activities. In the future, for formulating appropriate control management strategies for pollution abatement, monitoring and characterization of meteorological profile at cheyyur taluk level of Tamil nadu must be expanded and implemented.

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APPLICATION OF MULTINOMIAL LOGISTIC REGRESSION EQUATIONS TO ASSES
THE LEVELS IN tt-MA AMONG BENZENE EXPOSED GROUP

MALA. A., B. RAVICHANDRAN, S. RAGHAVAN, H. R. RAJMOHAN

There are only a few studies done on Multinomial logistic regression on benzene exposed occupational group. A study was carried out to assess the relationship between the benzene concentration and trans-trans-muconic acid, biomarkers in urine samples from petrol filling workers. A total of 117 workers involved in this occupation were selected for this current study. The multinomial logistic regression equations were used to predict relationship between benzene concentration and trans-trans-muconic acid. The results showed a significant correlation between benzene and ttMA among the petrol fillers. Prediction equations were estimated by adopting the physical characteristic viz., age, experience in years and job categories in petrol filling station workers.

Keywords: Multinomial Logistic Regression, Benzene, ttmA, Petrol filler

PREVALENCE OF OVERWEIGHT AND OBESITY AMONG ADOLESCENT BOYS AND RELATED FOOD BEHAVIORS

SHAHLA SHAFIEE AND KHYRUNNISA BEGUM

Over weight and obesity among children and adolescents is on an increase. It is a public health concern for both developed and developing countries due to its association with chronic diseases and the related morbidity and mortality. Statistics related to prevalence and etiology of obesity is vital for its control and management. This study investigates prevalence of over weigh and obesity in adolescent boys and their eating pattern. Methods: Family demography, BMI, family eating pattern and its related activities, eating outside home and parent influence was assessed in 1069 boys aged 10-19 years. Result: Majority of the selected boys was from middle and lower middle socio economic status (SES). 31.2 and 24.6% of them were in pre and post adolescent stages respectively. Prevalence of overweight and obesity among the boys was 12.0 and 5.8% only. Family eating pattern, parent influence and availability of foods all times at home seemed to exert significant influence on obesity and overweight. Conclusion: Parents significantly influenced eating behavior. SES and food availability significantly correlated with obesity and overweight among selected adolescent boys.

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DISEASE BURDEN OF CHIKUNGUNYA IN KARNATAKA

KAR P.K¹, GHOSH S.K¹, OJHA V.P¹, TIWARI S.N¹ AND DUA V.K²

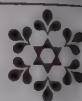
Chikungunya fever is an acute arthropod-borne viral illness reported in many parts of Africa, Western Pacific, South-east Asia and India particularly in southern parts. The causative agent is chikungunya virus, a single-strand positive RNA enveloped virus, is a member of the genus Alphavirus of the Togaviridae family and is transmitted from primates to humans primarily by *Aedes aegypti*. The name chikungunya comes from an African language Swahili- means bent up posture with severe joint pains (Arthralgia). Because, human act as a very appropriate reservoir for the virus, chikungunya is prevalent in urban area and epidemics are sustained by the human-mosquito-human transmission cycle. The first recognized outbreak of chikungunya virus occurred in East Africa (Tanzania and Uganda) in 1951 and 1953 and thereafter in other parts of the world. Since 2003, there have been outbreaks in the Islands of Pacific Oceans and Reunion Islands with a surge in the number of cases after the Tsunami of December of 2004. The transmission generally started in December 2005 and during the rainy season it gave rise to renewed epidemic circulation of the viral diseases reported in Southern parts of India particularly in the state of Karnataka. The unprecedented outbreak of huge magnitude affecting more than one million persons in the states of Andhra Pradesh, Maharashtra and Karnataka states of India causing severe public health and administrative concerns for management of situation. Chikungunya recorded in India after 32 years in 2006. The primary vector *Aedes aegypti* breeds in containers like overhead tanks, cement tanks, coconut shells, earthen pots, underground tanks, pitchers, coolers, tyre dumps in peri-domestic and in domestic places. In the present study, the role of vectors, their prevalence vis-à-vis case study with serological examination of blood samples, surveillance, monitoring and future implications since 2006 in the Tumkur and Gadag districts of Karnataka would be presented.

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MICRONUCLEUS (MN) FREQUENCY USED AS A BIOMARKER TO ASSESS THE CHROMOSOMAL DAMAGE IN DIFFERENT OCCUPATIONAL EXPOSURE.

PAVITHRA.N

The present paper reviewed the changes of micronucleus frequency due to different occupational exposure. The micronucleus (MN) is defined as microscopically visible, round or oval cytoplasmic chromatin mass next to the nucleus. The formation of micronucleus (MN) in dividing cells takes place as the result of chromosome breakage due to unrepaired DNA lesions, or chromosome malsegregation due to mitotic malfunction. The micronucleus (MN) can be evaluated in different kinds of cells such as lymphocytes, fibroblasts and exfoliated cells. Exfoliated epithelial cells are continuously in contact with the environment, can be easily collected and rapidly analyzed and are therefore a very appropriate cell system for the study of the micronucleus frequency. The micronucleus (MN) test is the most frequently used technique that is used to detect chromosome breakage. The micronucleus is evaluated using fluorescence insitu hybridization (FISH) and/or Giemsa staining. The reliability and low cost of the MN technique has contributed to the worldwide success and adoption of this biomarker to assess chromosomal damage. Increased frequency of micronucleus has been reported in workers who are occupationally exposed to pesticides, firefighters. The present paper recommends that micronucleus frequency can be used as a cytogenetic biomarker to assess the occupational exposure and human health problems.



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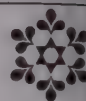


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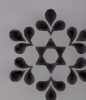
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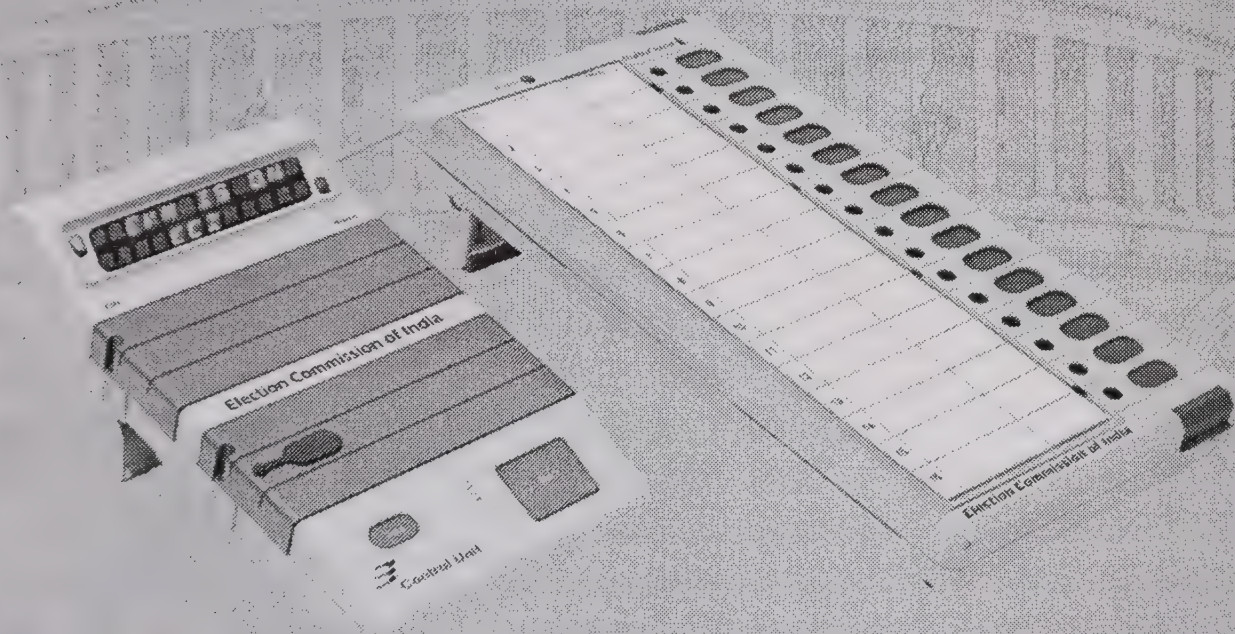
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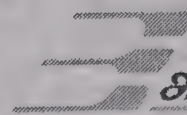


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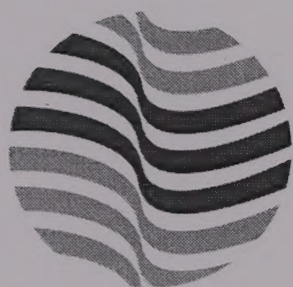


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